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TABLE OF CONTENTS

J. F. DASHIELL. Personality Traits and the Different Professions . . . 197
L. D. HARTSON. A Five Year Study of Objective Tests for Sectioning Courses in English Composition . . . 202
DONALD G. PATERSON AND MILES A. TINKER. Studies of Typographical Factors Influencing Speed of Reading. IV. Effect of Practice on Equivalence of Test Forms . . . 211
D. B. LUCAS AND C. E. BENSON. The Recall Values of Positive and Negative Advertising Appeals in Adults and Children . . . 218
MARION L. WILLIAMS. The Growth of Intelligence as Measured by the Goodenough Drawing Test . . . 239
WALTER VINCENT KAULFERS. Effect of Mental Age on Foreign Language Achievement . . . 257
JESSICA L. LANGWORTHY Blindness in Fiction . . . 269
EUGENE W. MARTZ. Mental Development in the Children of Delinquent Girls . . . 287
HAROLD A. EDGERTON. A Table for Finding the Probable Error of *R* Obtained by Use of the Spearman-Brown Formula ($n = 2$) . . . 296
NEWS AND NOTES . . . 303
BOOK REVIEWS . . . 305
NEW BOOKS AND PAMPHLETS . . . 307

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PERSONALITY TRAITS AND THE DIFFERENT PROFESSIONS

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A SIMPLE STATISTICAL INQUIRY

In current discussions of the analysis of vocations on the one hand, and the analysis of individuals on the other, an oversight of what should be a fairly obvious point is not infrequently to be observed. It might be styled the fallacy of distinct professions.

With our separate schools of training for the separate occupations of lawyer, physician, teacher, engineer, business expert, and clergyman, the fallacious assumption has often crept in that the learned professions may be considered quite distinct as concerns the psychological traits necessarily involved in their successful pursuit. On the other hand, analysis of the individual with a view to vocational counsel has often proceeded on the assumption that a given personality trait when found markedly present in the consultant may be taken as pointing strongly toward a career in law and away from teaching, or toward finance and away from medicine.

A simple experimental study of this point was undertaken by a limited questionnaire method. Fifty human traits were assembled from various books and articles written on the psychological aspects of vocational guidance. This list was then duplicated and a copy sent by previous arrangement to each of four professors in each of five professional schools at the University of North Carolina. Duplicated written instructions were given each to mark with a "2" the five traits in the list he considered most essential to success in the profession for which he was helping to prepare men; and to mark with a "1" the

five traits next most important. On the basis of the returns a tabulation was made so that the frequency with which each trait was mentioned with a "2" or a "1" by the men of the different professional schools could be readily counted. The table proved striking in showing to even casual inspection that the traits listed turned out to have but little differentiating value between the professions (at least, in the attitudes of the men judging). Many traits were rated high by judges in most of

TABLE 1

Rankings of the traits in order of importance for his profession by each of 18 professional school teachers

	MEDICINE				COMMERCE				TEACHING			ENGINEERING			LAW			
	A	B	C	D	F	G	H	I	K	L	M	O	P	Q	S	T	U	V
Tactfulness	9	2	6	5	7	8	7	7	8	4	7	11	4	8	8	9	3	10
Good personal appearance	12	6	8	12	12	6	11	11	9	6	4	9	7	12	11	12	5	11
Patience	10	7	5	10	8	11	4	8	10	3	6	7	12	7	4	11	11	3
Originality	6	11	11	11	5	9	5	6	11	7	10	8	10	9	9	4	12	12
Open-mindedness	5	9	2	6.5	6	3	12	9	12	2	5	5	8	10	10	8	10	9
Good memory	8	10	10	9	11	12	10	10	6	10	9	12	9	11	5	5	7	8
Leadership	11	12	12	8	1	2	2	12	1	1	12	10	11	2	12	10	8	5
Keen observation	1	1	3	4	4	4	6	3	7	8	11	4	6	6	6	3	6	6
Industry	7	5	9	2	3	10	1	5	4	5	2	2	2	3	2	2	2	2
Honesty	3	3	7	2	2	5	8	4	2	12	1	1	1	1	1	7	9	1
Analytical mind	2	4	1	6.5	10	1	3	1	5	9	3	3	5	5	7	1	1	7
Accuracy	4	8	4	2	9	7	9	2	3	11	8	6	3	4	3	6	4	4

the different schools; and many were rated high by one or two in each of several schools but not at all by their colleagues.

To make possible more definiteness in the summarizing of these opinions, a more limited number of traits was arranged by selecting from the original fifty the twelve given most frequent mention, and the judges were asked to rate all ten in an "order of merit" from "1" (most essential to success) to "10" (least essential). The results are presented in full in table 1. (Only three judges of major academic rank were available at the

time in the schools for teaching and for engineering.) In the table, under each profession is indicated by arbitrary letter each judge for that profession, and under this letter appear in vertical column the ranks assigned by him to the twelve traits.

Is there evidence here that these traits are differentiating for the several professions? This involves two sub-questions. (1) Are the ratings by teachers within the same profession in fairly close agreement? (2) Are the ratings by teachers of different professions fairly distinct?

In table 1, some points of agreement among the teachers of the same profession are in evidence. It would seem that honesty and industry are cardinal virtues for the engineer, industry

TABLE 2

Means of intercorrelations between rankings assigned by different individuals, averaged by professions

	MEDICINE	COMMERCE	TEACHING	ENGINEERING	LAW
Medicine	**.50**	.23	.09	.48	.36
Commerce	.23	**.21**	.11	.38	.28
Teaching	.09	.11	**.14**	.27	.10
Engineering	.48	.38	.27	**.54**	.46
Law	.36	.28	.10	.46	**.32**

for the lawyer, keen observation for the physician; evidently also good personal appearance and good memory are not important to the business man, nor is leadership to the medical. But many traits are non-differentiating; *e.g.*, tactfulness, open-mindedness, etc.

To subject the results to more accurate scrutiny, the amount of agreement between the ranking of the traits as assigned by each man and the ranking as assigned by every other man in the same and in other professions, was determined by the "foot-rule" formula,

$$R = 1 - \frac{6 \Sigma D^2}{n(n^2 - 1)}.$$

(Thus A's ranking correlated with B's, .42; with C's, .61; with D's, .60; with F's, .18; with K's, .85; etc.) Then the mean was obtained of all the correlations within each profession and between each two professions. These are shown in table 2. It is at once apparent that, in his opinion as to the general personal and character traits making for success in his profession, a teacher preparing students for one profession is little more likely to agree with a colleague in the same line than with a teacher preparing students for a very different profession.

SOME PRINCIPLES SUGGESTED BY THE RESULTS

(1) It would appear that one reason why the various professions do not become differentiated by our method is that these professions are not true units. The traits making for success in one line of "commerce," as accounting, may militate against success in another, as auto salesmanship; those making for a good "lawyer" in one line, as advocacy, may be disadvantageous to one in another line, as corporation counselling. One of our teachers returning his ranking of traits for medicine stated that in doing so he was considering the man of modest general practice, that were he considering the glitteringly successful great specialist he would arrange the rankings in almost an inverse order, and for a medical research worker he would arrange them in still a third order.

(2) It is suggested by our results that the men best qualified to estimate the *psychological* aspects of a profession or occupation may not be those who are pre-occupied with giving training in the particular bodies of knowledge and in the particular techniques and skill, but those who by special training of a psychological sort are equipped to give psychological analyses.

(3) After all, traits such as those listed in this investigation may be little more than names of faculties that have little psychological reality; and aptitudes for acquiring certain specific knowledges and specific skills may be more fruitfully tested.

(4) It is clearly suggested that so far as equipment of personal traits is concerned, a given individual is likely to do almost as

well in one professional line as in another, granted the same opportunities for training, and granted the same motivation. And this last points to the observation that psychologists interested in vocational problems have been on the right track in emphasizing the study of interests; and the recent developments of technique for occupational interest-analysis at the hands of Freyd, Strong, Remmers, and others, are most promising.

A FIVE YEAR STUDY OF OBJECTIVE TESTS FOR SECTIONING COURSES IN ENGLISH COMPOSITION

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Until 1924 the subfreshman group in English Composition at Oberlin had been selected by the theme-reading method. Two themes written during the first sessions of the semester were read by a group of the teachers. Later evaluation has shown the fallibility of these subjective estimates. Since 1923 the departments of English and Psychology have been in search of a better method for sectioning the course.

After consulting the literature, tabulating local correlation data, and after receiving helpful counsel from Dr. Herbert A. Toops, the following group of tests was compiled for administration in 1924: The Inglis Test of English Vocabulary, The Iowa Comprehension Test, the Briggs Grammatical Analogies (thrown into multiple choice form and given a ten minute time limit), and three tests devised at Oberlin: (1) two forms of a Sentence Reconstruction Test, (2) a Paragraph Reconstruction Test, and (3) an Information Test.

The Sentence Reconstruction Test, Forms I and II, consists of a short narrative of faulty composition which the subject is instructed to correct, either by rearranging the word order or by substituting words or phrases from a list appended to each sentence. The time allowance is 30 minutes. For example, one of the sentences appears as printed below:

(1) An (2) interesting (3) occurrence (4) during (5) his (6) war experiences (7) was (8) the fact (9) that he participated (10) in the engagement (11) known (12) as Pickett's Charge, (13) to students of history.

(14) one of his

(15) which is

(16) the participation

The student is instructed to reconstruct the sentence, using only the material given in the sentence and the appended list, indicating the correct order by writing the numbers of the words on the line.

The Paragraph Reconstruction Test is an adaptation of a device used when he was teaching Academy English by R. H. Stetson, of Oberlin. Paragraphs are selected in which the sentences constitute a logical sequence. As presented in the test these sentences are out of their original order; the problem is to reconstruct the paragraph. The material used represents narrative, description, argument, instructions and exposition. The time allowance is 15 minutes.

In 1924 the composition course was sectioned by the usual theme-reading method. At the end of the first semester comparison was made of the effectiveness of this method and the objective test method. The criterion used was the final course grades. It is assumed that, as a rule, those students who were unable to obtain grades better than a "D Plus" should have had the benefits of subfreshman treatment, and that those who were graded "B" or better were superior to the average student in this type of work. A comparison of the two methods shows that in 1924 whereas the theme-reading method detected but 56.2 per cent of the poor students, the test method picked out 73.6 per cent; and that whereas 14.9 per cent of those who were subbed by the theme method were good students, this was true of but 12.7 per cent of those who were below the critical score in the tests.

It is of some incidental interest to insert at this point a paragraph concerning the relationship between these test scores and the grades in the modern foreign languages. When the students in these courses are grouped in three sections according to test scores, each section numbering approximately one-third of the class, it is found that 65 per cent of the best group obtained good grades ("B" or better) and that only 13 per cent obtained low grades (below "C"). Of the third that stood lowest in these psychological tests, only 9 per cent obtained good grades and 65 per cent obtained low grades. It would appear, therefore,

that the tests used this first year of the investigation measure general linguistic abilities rather than those required specifically in English Composition.

Correlations were computed between each of the tests and the semester grades, for the total average grade as well as for the grades in Composition. These with the intercorrelations between the tests are on file in the Oberlin Psychological Laboratory. In the case of the men for whom the figures have proved to be uniformly more significant the correlations with the grades in composition range from .60 for the Inglis Vocabulary to .31 for the poorer form of the Sentence Reconstruction Test.

During the period from 1925 to 1927 the data accumulating from the administration of the Sentence and Paragraph Reconstruction Tests were tabulated and examined. This process revealed some of the weaker elements in the tests. The weaknesses revealed by this examination were eliminated in the revisions.[1] Two major changes were made in the Sentence Reconstruction Test. The content of the test was changed by the substitution of a section of Lamb's version of Macbeth, after great liberty had been taken with the diction. The second change consisted of the use of the interlinear method of correction. In its latest edition this test reads, in part, as follows:

> Suddenly approaching the room he seen another dagger appear from somewheres in the air, whose blade and handle is covered with blood. Trying to grasp it there wasn't nothing there, but he could of screamed due to his fright.

The subject is instructed to draw a line through the faulty word or punctuation mark and to write directly above it the correct form.

The changes made in the Paragraph Reconstruction Test consisted, first, of using only those paragraphs out of the previous editions which showed high validity; and second, of compiling one form in which the correct initial sentence was indicated. When scores in these tests were correlated with total semester grades (class of 1930 during the freshman year), the

[1] Acknowledgment is due to L. L. Hanawalt for the suggestion of new material and to Loren Hadley for the tabulation of grammatical errors.

following r's were obtained: Men: Form III (first sentence indicated) $r = .348$, Form IV $r = .497$; Women: Form III $r = .467$, Form IV $r = .412$. For each correlation reported in the paper N is at least 160. The intercorrelations between the two forms were .579 for the men and .497 for the women. Inasmuch as the reliability coefficient, using the odd and even items and correcting by the Spearman prophecy formula, is in the neighborhood of .85, it is apparent that these two forms of what we have been calling a single test may in reality be two different tests. It is obvious that the task is much more difficult when one has first to determine the theme of the paragraph.

During the years 1925–27 the test scores were used together with the themes as a basis for sectioning the course in Composition. For the year 1927–28 it was decided to vary the procedure in order again to validate the tests. The course was sectioned solely on the basis of the theme-reading and correlations were computed with the grades given in mid-term (after the first six weeks), as well as with those finally reported for the semester. Local experience suggests that for this two-hour course it is not feasible to obtain an adequate estimate of the freshman's ability in less than six weeks. The following groups of tests were administered during freshman week: The Ohio State University Psychological Examination, Paragraph Reconstruction Form V (in which the initial sentence is not indicated), Sentence Reconstruction Test in both forms described above but using the Macbeth material, and the Pressey Diagnostic Tests of English Composition. Table 1 summarizes the coefficients obtained when the scores in the different tests were correlated with the grades in Composition.

Table 1 reveals the following salient facts:

(1) The correlation between the grades and the scores in the more general tests (the O. S. U. Linguistic tests and Paragraph Reconstruction) were closer at the first of the semester than at the end. On the other hand, the correlation between the grades and the scores in the composition tests (Pressey and Sentence Reconstruction) were higher at the end of the semester. It will be noted that the r between grades and "intelligence" fell off

from .493 to .275, in the case of the men, and from .438 to .255 with the women. One wonders whether this means that first estimates were made more largely on the basis of the students' general ability than were the later estimates, which were affected more specifically by the actual achievements in Composition.

(2) The tests which furnish the best basis for predicting final grades in Composition were those for the most mechanical of

TABLE 1

Correlations between the Oberlin Test Series for 1927–28 and the English Grades for the Class of 1931

	MEN		WOMEN	
	Six weeks	Semester	Six weeks	Semester
Pressey tests				
1. Capitalization	.376	.373	.115	.201
2. Grammar	.425	.486	.485	.473
3. Punctuation	.491	.508	.488	.387
4. Sentence structure	.443	.443	.371	.331
Total Pressey score	.583	.634	.418	.433
Sentence reconstruction V	.456	.468	.299	.348
Sentence reconstruction VI	.489	.556	.423	.288
Paragraph reconstruction V	.331	.282	.404	.293
O. S. U. linguistic tests and paragraph reconstruction	.493	.275	.438	.255
Total score	.614	.624	.529	.554

the elements involved in the work. Students are supposed to have automotized the correct use of these factors during the grammar grades. The men, of whom these comments are particularly significant, since they are not so highly selected as are the women, showed an r of .634 for the correlation between semester grades and scores in the Pressey tests. These data agree with those obtained by Guiler and Pressey who emphasize the fact that the handicaps of the college student frequently

consist of short-comings in some of the fundamentals of the tool subjects.[2]

(3) The correlations show that the Sentence Reconstruction Tests had been greatly improved as the result of the revisions. In the 1924–25 series the correlations between the semester grades and the scores in two forms of the test were: for the men, .356 and .307; in the 1927–28 series they were .468 and .556.

TABLE 2

Comparison of theme method and test method of sectioning composition course

	TOTAL FRESHMEN	LOW (D–E) GRADES	HIGH (B–A) GRADES	THEME METHOD					TEST METHOD				
				Total subbed	Subs graded low	Per cent of low students subbed	Subs graded high	Per cent of subs with high grades	Total subbed	Subs graded low	Per cent of low students subbed	Subs graded high	Per cent of subs with high grades
Six weeks grades													
Men	158	63	19	28	21	33.3	3	10.8	35	25	39.7	0	0
Women	159	39	42	13	8	20.6	1	7.7	6	2	5.1	0	0
Total	317	102	61	41	29	28.5	4	9.8	41	27	26.5	0	0
Semester grades													
Men	158	30	43	28	13	43.3	5	17.9	35	20	66.7	1	2.9
Women	159	13	72	13	5	38.5	3	23.1	6	1	7.7	0	0
Total	317	43	115	41	18	41.9	8	19.6	41	21	48.9	1	2.4

In the earlier series the r's for the women were but .156 and .124, whereas in the later form they were .348 and .288 (and in the six-weeks grades .423).

Comparison of the validity of the Theme-Reading Method with the Test Method of sectioning the course.

[2] Guiler, W. L., Unpublished paper read at a conference called by the State Department of Education, Columbus, December 2, 1927. Pressey, S. L., and Others, Research Adventures in University Teaching.

In 1927–28 the instructors nominated 28 men and 13 women for subfreshman sections. Table 2 reports a comparison between this group which was subbed and a group of the same size who stood at the foot of the list in the test scores. This small group was chosen, rather than the larger number which more adequately represents the proportion of the class whose work was unsatisfactory, in order to see just how the theme method would compare with the test method limited to a group of this size. Examination of the data reveals the following facts:

(1) A group of 41 selected by either method would include less than 30 per cent of those who were reported as having done poor work during the first six weeks. By the end of the semester this proportion is still less than 50 per cent.

(2) The test method selected approximately the same proportion of those reported as doing poor work during the first six weeks (26.5 as compared to 28.5) and 7 per cent more of those whose final marks were low (48.9 per cent as compared to 41.9).

(3) On the other hand, the theme method made the mistake of subbing a number of students shown by the grades to be good students. In the first report these constituted 9.8 per cent, and in the semester report 19.6 of those subbed. In contrast to this not one of those who would have been subbed by the test method received a good grade in the first report and only one at the end of the semester. The test method furnished the more accurate critical score.

(4) It will be noted that inferior work in Composition was confined almost entirely to the men. The number of women involved is so small as to invalidate the significance of the proportions. Comparisons that are limited to the men emphasize still more distinctly the superiority of the test method.

Table 3 presents a theoretical division of the class into almost equal thirds on the basis of the test score (the total in the tests listed in table 1). The table is computed on the basis of the two sets of grades. If the course had been sectioned as here indicated, the more capable section (*A*) would have included only six who were reported as doing poor work at the end of six weeks, and only one so reported in the final summary. Of this

TABLE 3

The composition course sectioned on the basis of psychological test scores

	TOTAL ENROLLMENT	SECTION A							SECTION B							SECTION C						
		Number in section	Number with A-B grades	Per cent with A-B grades	Number with C-C$ grades	Per cent with C-C$ grades	Number with F-D$ grades	Per cent with F-D$ grades	Number in section	Number with A-B grades	Per cent with A-B grades	Number with C-C$ grades	Per cent with C-C$ grades	Number with F-D$ grades	Per cent with F-D$ grades	Number in section	Number with A-B grades	Per cent with A-B grades	Number with C-C$ grades	Per cent with C-C$ grades	Number with F-D$ grades	Per cent with F-D$ grades
Six weeks grades																						
Men	158	34	10	29.4	22	64.8	2	5.8	52	6	11.5	29	55.8	17	32.7	73	2	2.7	25	34.2	46	63.1
Women	159	69	30	43.5	35	50.7	4	5.8	53	12	22.7	28	52.8	13	24.5	36	0	0	15	41.7	21	58.3
Total	317	103	40	38.8	57	55.4	6	5.8	105	18	17.1	57	54.3	30	28.6	109	2	1.9	40	36.7	67	61.4
Semester grades																						
Men	158	34	19	55.9	15	44.1	0	0	52	20	38.5	30	57.7	2	3.8	73	4	5.5	39	53.5	30	41.0
Women	159	69	49	71.0	19	27.5	1	1.5	53	19	35.9	32	60.3	2	3.8	36	4	11.2	23	63.8	9	25.0
Total	317	103	68	66.1	34	33.0	1	.9	105	39	37.2	62	59.0	4	3.8	109	8	7.3	62	56.9	39	35.8

group of 103, less than 1 per cent failed to make at least a "C", and two-thirds made grades of "B" or better. On the other hand, the least capable section as judged by the scores in the psychological tests included nine-tenths (88.7 per cent) of the poor students as determined by semester grades. At the same time it included only 2 who ranked high in the six weeks report and but 8 with grades of "B" for the semester. The evidence is clear that these tests provide data which would make possible a homogeneous grouping of the students in this course.

From the viewpoint of administrative efficiency it will be noted that when the tests are administered during freshman week it is possible to have the scores tabulated in time to section the course before the first session of the year, whereas the theme-reading method requires several weeks after the course is under way.

STUDIES OF TYPOGRAPHICAL FACTORS INFLUENCING SPEED OF READING

IV. Effect of Practice on Equivalence of Test Forms[1]

DONALD G. PATERSON and MILES A. TINKER

University of Minnesota

In continuing our studies on typographical factors influencing speed of reading, we undertook to investigate, (1) the effect of simultaneous variation in size of type and length of line and (2) the effect of small variations in length of line in the region of the previously ascertained optimum with size of type constant. The only difference in procedure from that employed previously in this series was the introduction of a control group in which Forms A and B of the Chapman-Cook Speed of Reading Tests were identical in typographical arrangement. One such control group was utilized in each of the two current investigations. On the basis of previous results these two control groups should have yielded identical average scores in Forms A and B (within the limits of variability of the means). But such equivalence was absent. Since the validity of our investigations depends upon such equivalence it seems desirable to analyze the factors responsible for lack of equivalence between Forms A and B as obtained in the present study.

This failure of Forms A and B with identical typography to

[1] The writers gratefully acknowledge their indebtedness for aid in conducting these studies to the following: J. B. Lippincott Co., Philadelphia, for permission to reprint the Chapman-Cook Speed of Reading Tests, Forms A and B, for experimental purposes; the University of Minnesota Graduate School for research grant; and the psychology departments of Hamline University, Macalester College, and the College of St. Catherine for permission to test their sophomore psychology students to complete the main test groups obtained at the University of Minnesota.

yield approximately identical average scores was not anticipated in view of our former results. In our first study,[2] using an ABBA sequence with 320 college subjects, Form A was approximately equal to Form B in test administration. Equality was also demonstrated by the administration of this test to 2260 high school seniors. (Mean scores, Form A = 17.465; Form B = 17.479; see p. 121.)[3]

The insertion of control groups in our further studies was made not with a view of added demonstration of equivalence

TABLE 1

Relative difficulty of Forms A and B when given to college subjects previously exposed to the Speed of Reading Tests

Differences given are for the mean score on Form A, 10 point, 80 mm. line (19 picas), set solid, minus the mean score on Form B typographically identical. The mean score is the average number of paragraphs of 30 words each in the Chapman-Cook Speed of Reading Tests read in 1¼ minutes. In each group, N = 80 subjects.

TEST GROUP	TEST FORM	MEAN	P.E.$_{dist.}$	P.E.$_{M}$	DIFFERENCES BETWEEN MEANS	P.E.$_{diff.}$	$\frac{D}{P.E._{diff.}}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I	A	18.96	2.71	0.30	0.77	0.17	4.58
	B	18.19	2.37	0.26			
II	A	20.16	2.93	0.33	1.62	0.20	8.18
	B	18.54	2.78	0.31			

but for the purpose of more precise measurement of variability in the various sub-groups in each main experiment. These two control groups, however, yielded average scores for Forms A and B which are decidedly not equivalent as may be seen in

[2] M. A. Tinker and D. G. Paterson, Studies of Typographical Factors Influencing Speed of Reading, I. Type Form, Jour. of App. Psychol., 1928, 12, 359–368.

[3] D. G. Paterson and M. A. Tinker, Studies of Typographical Factors Influencing Speed of Reading, II. Size of Type, Jour. App. Psychol., 1929, 13, 120–130.

table 1. It will be noted that the difference between the mean scores is 0.77 paragraphs for the first sub-group and 1.62 for the second. In each case Form B is definitely more difficult than Form A. These differences are statistically significant as shown in column 8 (using formula for *correlated measures; r* between A and B for sub-group I is $+.83 \pm.02$; r for sub-group II is $+.81 \pm.03$).

Scrutiny of the mean scores for Form A in table 1 and the mean scores for Form A in the remaining twelve sub-groups in our main experiments, mentioned at the outset of this article, revealed a decided trend toward higher mean scores for our present data in contrast to the mean scores obtained for the eleven sub-groups in our Size of Type and Length of Line studies published in 1929.[4] The average score for Form A (14 sub-groups combined) in our present data is 19.54; the average score for Form A (11 sub-groups combined) in our previously published data is 18.67. This suggested that some uncontrolled factor was operative in raising the mean reading performance of our present subjects as compared with our subjects tested in 1928 (published in 1929). In view of the fact that our 1928 subjects had never been exposed to these tests whereas most of our present subjects had taken the tests during the preceding year it would seem reasonable to conclude that practice effects were primarily responsible for the increased mean scores. Thus, the hypothesis is suggested that such practice effect itself might upset equivalence between Forms A and B. If this be true, then experimentation on typographical factors influencing speed of reading this test material should be confined to subjects who have never been exposed to the test forms.

This hypothesis was subjected to an experimental check by the analysis of three sets of data available in our laboratory.[5]

[4] Paterson and Tinker, II. Size of type, op. cit., and M. A. Tinker and D. G. Paterson, III. Length of Line, Jour. App. Psychol., 1929, 13, 205–219.

[5] We are indebted to Professors Charles Bird and Peter E. Schellenberg for permission to use data collected in connection with their How to

The first set of data was yielded by 235 students (mostly freshmen) taking the Chapman-Cook tests A and B for the first time in a course in How to Study. The second set was yielded by 315 students (mostly freshmen) taking these same tests for a second time in the same course in How to Study. The third set was obtained from 140 sophomore students in the Psychology Laboratory course who had already taken the same tests two or more times at earlier dates. Comparative data for these three groups are presented in table 2.

TABLE 2

Relative difficulty of Forms A and B when given to college subjects with and without previous exposure to the Chapman-Cook Speed of Reading Tests

(See table 1 for specifications of typographical comparisons)

TEST GROUP	TEST FORM	MEAN	P.E.dist.	P.E.M	DIFFERENCES BETWEEN MEANS	P.E.diff.	$\frac{D}{P.E._{diff.}}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
III. No previous experience (N = 235)	A	16.69	2.54	0.17	0.00	0.12	0.00
	B	16.69	2.32	0.15			
IV. Previous experience (N = 315)	A	19.29	2.53	0.14	0.98	0.07	13.80
	B	18.31	2.56	0.14			
V. Previous experience (N = 140)	A	21.46	3.45	0.29	0.48	0.15	3.24
	B	20.98	2.85	0.24			

The most crucial comparison is that which shows an absolute equivalence of Forms A and B for freshman subjects being tested for the first time (Group III) as contrasted with a difference of approximately one paragraph between the means for Forms A and B for freshman subjects being re-tested (Group

Study courses; and to Mr. Oscar Litterer for permission to used at a collected in the Psychology Laboratory in connection with another investigation.

IV). This comparison emphasizes two points, (1) again, when a test group is subjected to the tests for the first time Forms A and B yield equivalent average scores, and (2) when a test group is re-tested, the practice effect applies unequally to the two forms so that mean scores in Form B are not increased to the same extent as in Form A. However, additional practice (taking the tests more than twice) does not seem to produce as marked a discrepancy between the means of the two forms (Group V, difference approximates half a paragraph). *It seems reasonable to conclude that equivalence between Forms A and B can only be assumed when these tests are administered to subjects who have had no previous experience with them.* For this reason, in our further work as in our first three studies already published care will be taken to employ as subjects only those who are taking the tests for the first time.

In partial explanation of the variable effect of practice upon equivalence in difficulty of Forms A and B it might be suggested that the original equality between Forms A and B is due to the test situation and not to inherent equality in paragraph structure. The factors involved in the test situation seem to be novelty and strangeness. In other words, Form A is inherently easier than Form B yet, when first presented, the element of strangeness retards the reading of Form A just enough to make reading performance equal that of Form B. With adaptation to the test situation, novelty disappears and Form A becomes easier than Form B. Evidence for such a greater inherent difficulty of Form B was presented in our first paper in this series (I. Type Form, p. 362), where we showed that when Form A follows Form B there was a difference between mean scores of 4.07 paragraphs. All of this is indicative of the extent to which subtle factors complicate performance under psychometric conditions. Hence, the need for adequate controls and checks in every phase of an experimental program.

The significance of the findings herein described apply not only to our particular problem but also to many other testing problems as well. It may well be that duplicate scholastic and mental test forms standardized as being equivalent in difficulty

lose such equivalence when re-tests are made. In other words, demonstrated equivalence for published standard tests can not be accepted as valid for two or more repetitions, unless practice effects are demonstrated through experiment to have little or no effect upon the equivalence originally established. From our knowledge of the literature it would seem that this point has not received the attention which it merits.

SUMMARY AND CONCLUSIONS

1. In continuing our studies on typographical factors influencing speed of reading it was found that a previously demonstrated equivalence of difficulty for Forms A and B of the Chapman-Cook Speed of Reading Test did not hold when the tests were administered to a group of subjects most of whom had previously taken the same tests.

2. Analysis of three sets of data demonstrated: (*a*) when a group of subjects is subjected to the tests for the first time, Forms A and B yield equivalent average scores; (*b*) when a group of subjects is re-tested, the practice effect does not apply equally to the two forms but instead results in a greater increase in average scores in Form A than in Form B; and (*c*) the practice effect in administering further trials does not produce as marked a discrepancy between the means of the two test forms as resulted from a single repetition.

3. Thus, equivalence in difficulty of Forms A and B of the Chapman-Cook Speed of Reading Tests has been demonstrated for subjects taking the tests for the first time with three different groups of subjects, namely, high school seniors, college freshmen, and college sophomores. For this reason, we may be reasonably certain that our previously published comparisons are valid. Future work, to be equally valid must also utilize subjects who have not been exposed to these tests.

4. There is reason to believe that the original equality in difficulty between Forms A and B is due to a balancing of opposed factors, i.e. Form A is inherently less difficult than Form B, but the element of strangeness retards the reading of Form A just enough to make reading performance equal that of

Form B. With repetition, adaptation removes the element of strangeness and Form A becomes definitely easier than Form B.

5. The findings indicate that demonstrated equivalence for duplicate forms of published standard tests can not be accepted as valid except for the first trial. Experiments involving several trials and dependent upon continued equivalence in difficulty of duplicate test forms should be carefully controlled with respect to such variable practice effects.

THE RECALL VALUES OF POSITIVE AND NEGATIVE ADVERTISING APPEALS

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PART I. WITH ADULT SUBJECTS

The following is a report of the results of a study of the relative recall values of positive and negative appeals in advertising. There has been a rapid increase in the use of negative appeals since 1920, according to a historical investigation which was reported in the August, 1929, issue of the JOURNAL OF APPLIED PSYCHOLOGY.[2] This increase is consistent with the findings of a study of coupon returns for positive and negative appeal advertisements which was reported in the June issue of this journal.[3] The coupon results indicated that negative appeals were as effective as positive appeals for the products which were studied. Positive and especially negative appeals are essentially personal appeals. The present increasing use of personal advertisements is resulting in a growth in negative appeals. This report will analyze the laboratory response to positive and negative advertisements and compare their effectiveness upon the mental processes.

The technique followed in this work is that which Dr. A. T.

[1] Now at Iowa State College.

[2] Lucas, D. B., and Benson, C. E. The historical trend of negative appeals in advertising. The Journal of Applied Psychology, August, 1929, vol. xiii, no. 4.

[3] Lucas, D. B., and Benson, C. E. The relative values of positive and negative advertising appeals as measured by coupons returned. The Journal of Applied Psychology, June, 1929, vol. xiii, no. 3.

Poffenberger, of Columbia University, has used in research on the effects of advertisements upon the memory function.[4] Dr. Poffenberger has significantly said that, "As there are today numerous brands of the commonly used articles that really differ little in quality, it is largely a matter of obeying the laws of recall that determines which particular brand shall be bought."[5] On the basis of this statement it would seem that recall values of advertisements give a reliable index of their sales effectiveness. Starch enthusiastically says, " . . . . I am inclined to believe that a series of carefully conducted tests gives a more reliable measure of the effectiveness of a set of advertisements than records of inquiries or sales, unless these are sufficiently extensive to iron out the influences due to such factors already mentioned as variations by season, sizes of space, circulation, quality of readers, and so on."[6]

Definition

A positive appeal is an attempt to motivate the reader to attain something desirable. In contrast, a negative appeal is designed to lead the reader away from some annoying situation. The escape from undesirable circumstances often implies the attainment of positive success, though not always. Advertisers commonly dwell upon either the positive end or the negative annoyance to the exclusion of the other.

The method of procedure

Positive and negative advertisements were compared in two types of recall studies, namely, pure recall and aided recall. In testing pure recall the subject is asked to reproduce the advertised name without any suggestion or assistance. In aided recall tests the subject is given a clue to the goods.

[4] Poffenberger, A. T. Psychology in Advertising; published by A. W. Shaw Company, 1926. Chapter XX.

[5] Poffenberger, A. T. Psychology in Advertising, published by A. W. Shaw Company, 1926. Page 482.

[6] Starch, Daniel. Principles of Advertising, published by A. W. Shaw Company, 1926. Page 315.

After seeing the advertisements he may be given the suggestion, "fountain pen," to which he responds "Parker Duofold." This latter process resembles a common buying sequence in which the customer realizes that he needs a fountain pen and then tries to recall some desirable brand of pen.

The measurement of pure recall values was included in this study because of their high correlation with aided recall values. Brandt found this value to be .70.[7] In combining the two tests of recall it is probable that the results for aided recall are slightly influenced by those for pure recall. The reason for this will be evident in the procedure, but it should not alter the value of the comparative results. It will be noticed that all of the recall material was obtained immediately after the advertisements had been seen. This was a convenient procedure, but is justified by the fact that immediate recall correlates closely with delayed recall, the latter being more directly related to the buying process. Gates found that, "A positive and high (.73 to .89) correlation exists between immediate recall and delayed recall when both functions are measured by absolute amounts."[8] It would appear, therefore, that tests of immediate recall indicate the later as well as the immediate values of appeals.

The material tested

The material for the tests consisted of 15 positive magazine advertisements and an equal number of negative advertisements, representing a total of 30 different products. All of the advertisements were selected at random with the exception of those factors which could be kept equal. Each advertisement contained an illustration, headlines and text. For each positive advertisement there was a corresponding negative advertise-

[7] Poffenberger, A. T. Psychology in Advertising, published by A. W. Shaw Company, 1926. Page 516. (Taken from "Measuring the Memory Value of Color in Advertising," by E. R. Brandt, M. A. thesis, Columbia University, 1924, unpublished.)

[8] Gates, A. I. Correlations of immediate and delayed recall. Journal of Educational Psychology, vol. ix, no. 9, November, 1918, page 495.

ment of equal size, from the same medium, and similar as to the use of color. Care was taken to exclude advertisements of any products which are represented by only one prominent brand on the market. For instance, Campbell's Soup was not accepted as one of the advertised products because of its popularity and practical monopoly in the general magazine advertising of this product. Otherwise, the advertisements represented a random sampling so far as kinds and brands of goods were concerned, each type of advertisement being equally favored in the objectively measureable factors. The reason for using so many of each type was to offset or equalize the effects of other variables which could not be detected or eliminated. The list of advertised goods follows with odd numbers designating positive advertisements and even numbers designating negative advertisements:

1. Blue Label Ketchup, Curtice Brothers Company
2. Post's Bran Flakes, Postum Cereal Company
3. Pompeian Bloom Rouge, Pompeian Laboratories
4. Mum, Mum Manufacturing Company
5. Kroehler Living Room Furniture, Kroehler Manufacturing Company
6. Bauer and Black First Aid Products, Bauer and Black
7. Coca-Cola, Coca-Cola Company
8. Kolynos Dental Cream, Kolynos Company
9. Palmolive Soap, Palmolive Company
10. Eagle A Business Paper, American Writing Paper Company
11. Hoover Electric (vacuum) Cleaner, Hoover Company
12. Cutex Cuticle Cream, Northam Warren
13. Dodge Brothers Motor Cars, Dodge Brothers
14. Metropolitan Life Insurance Company
15. Parker Duofold Pen, Parker Pen Company
16. Lane Cedar Chest, Lane Company
17. Perfection Cook Stoves, Perfection Stove Company
18. Alemite Lubrication, Bassick Manufacturing Company
19. Oh Henry! Candy, Williamson Candy Company
20. Zonite, Zonite Products Company
21. Nairn Linoleum, Congoleum-Nairn Incorporated
22. Daniel Green Comfy Slippers, Daniel Green Felt Shoe Company
23. Iron Clad Hosiery, Cooper, Wells and Company
24. Asbestocel, Johns-Manville Corporation
25. Utica Sheets, Utica Steam & Mohawk Valley Cotton Mills

26. Ovaltine, The Wander Company
27. Brambach Baby Grand Pianos, Brambach Piano Company
28. Nujol, Nujol Laboratories
29. Sunkist Lemons, California Fruit Growers Exchange
30. Gold Medal Flour, Washburn Crosby Company

Method of conducting the recall tests

The recall tests were designed for groups of 30 subjects, although the number could be increased to 60 by permitting two people to see the same advertisement simultaneously. In each test advertisements were distributed among the members of the group with the simple instruction that they were to follow directions when given. Each advertisement was kept folded until the word was given to begin. The subjects were then told to look at their own advertisements as much as desired until they were directed to pass to the next individual. The time allowed for each advertisement was 45 seconds. The 30 advertisements were passed until each subject had seen all of them. They were then collected and the subjects were ready for testing as to the material retained.

In order to determine the pure recall values for the advertisements the subjects were allowed to write immediately the names of the articles advertised. They were provided with blank sheets of paper and instructed to give the trade name or the manufacturer's name for each article that could be recalled. Four minutes were required for completing this part of the experiment by the first group and this was used as a standard time for the remaining groups.

Immediately after the pure recall tests each subject was provided with the following list of the articles which they had seen advertised:

Advertisements

A Ketchup.....
A Cereal.....
A Rouge.....
A (Body) Deodorant.....
Home Furniture.....
First Aid Supplies.....

A Cold Beverage.....
A Toothpaste.....
A Toilet Soap.....
A Brand of Paper.....
A Vacuum Cleaner.....
A Manicure Article.....
A Motor Car.....
A Life Insurance Company.....
A Fountain Pen.....
A Cedar Chest.....
A Cook Stove.....
A Lubricating Accessory.....
A Candy.....
A Germicide.....
A Linoleum.....
House Footwear.....
Stockings.....
A Heat Insulator.....
A Brand of Sheets.....
A Nerve Tonic.....
A Make of Piano.....
An Oil for Internal Use.....
A Brand of Lemons.....
A Flour.....

They were then instructed to write the trade name or manufacturer's name after each article named in the list. This constitutes an aided recall test but it is obvious that the results are applicable only to a comparative study. Since the subjects had already completed the pure recall test, each person had had in effect a review of those names which he was able to reproduce. The names which were remembered for the pure recall test had the advantage of this review in the writing of the aided recall test. The first group required five minutes for the aided recall test and this period was used as a standard for succeeding groups.

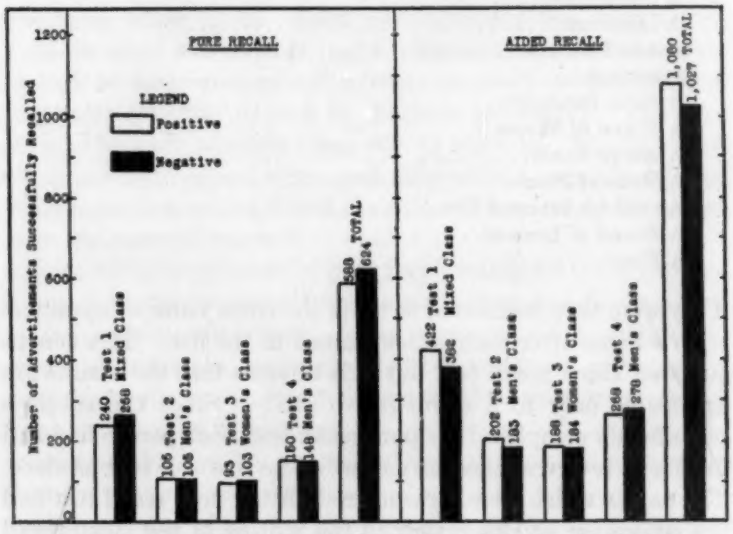
The sources of the data

Four adult groups of students contributed data on the studies of recall values. These groups included four classes of college graduate and undergraduate students. Their descriptions follow:

Test No. 1. New York University students in a graduate class in educational psychology	45
Test No. 2. Rutgers men in an elementary psychology class	19
Test No. 3. New Jersey College women students in psychology	17
Test No. 4. Rutgers men in an elementary psychology class	27
Total	108

Recording the data

The errors in trade names and manufacturers' names were discarded and the results for each group were recorded in detail.



Graphic Summary of the Recall Scores for Positive and Negative Advertisements

FIG. 1

The errors ranged all the way from inconsequential mistakes in spelling to completely wrong names. There was no sharp division between recognizable attempts to name the right product and unrelated attempts. For that reason, in order to define the method of eliminating errors, it was necessary to consider all errors in spelling as failures with certain stated ex-

TABLE 1

Summary of the results of the recall tests for positive and negative appeals in advertising, with scores for individual advertisements

NUMBER OF ADVERTISEMENT	NUMBER OF TIMES ADVERTISEMENT WAS RECALLED CORRECTLY									
	Pure recall					Aided recall				
	Test 1	Test 2	Test 3	Test 4	Total	Test 1	Test 2	Test 3	Test 4	Total
Positive appeal advertisements										
1	10	11	5	7	33	24	16	8	20	68
3	9	0	3	4	16	18	9	10	12	49
5	9	3	5	3	20	10	5	5	4	24
7	14	4	1	11	30	39	18	16	21	94
9	30	8	12	15	65	41	19	16	26	102
11	17	6	9	11	43	38	15	17	26	96
13	36	15	13	22	86	41	19	16	26	102
15	14	5	2	6	27	38	19	16	24	97
17	9	9	5	7	30	22	12	11	13	58
19	15	6	5	12	38	38	16	17	25	96
21	14	9	6	10	39	16	9	7	14	46
23	22	15	9	23	69	24	16	14	23	77
25	12	1	4	1	18	22	4	8	7	41
27	10	3	4	4	21	13	7	12	5	37
29	19	10	10	14	53	38	18	15	22	93
Totals...	240	105	93	150	588	422	202	188	268	1,080
Negative appeal advertisements										
2	16*	7	2	10	35	29*	13	11	22	75
4	29	11	16	17	73	33	17	17	26	93
6	15	8	8	10	41	9	12	15	21	57
8	19	6	12	8	45	29	15	14	20	78
10	31*	1	6	6	44	39*	9	11	19	78
12	14	9	9	7	39	30	14	17	22	83
14	32	8	8	14	62	34	15	15	21	85
16	9	2	3	2	16	13	5	6	8	32
18	15	12	8	12	47	20	18	12	25	75
20	15	12	4	14	45	26	15	12	21	74
22	6	3	2	6	17	26	7	12	12	57
24	15	6	4	10	35	10	10	7	16	43
26	16	2	2	11	31	18	5	7	13	43
28	18	14	11	11	54	31	15	15	15	76
30	18	4	8	10	40	35	13	13	17	78
Totals...	268	105	103	148	624	382	183	184	278	1,027

* Advertisements no. 2 and no. 10 were changed after Test 1.

ceptions. Such a strict method threw out a great many names which would be acceptable for practical purposes, especially in the case of younger subjects. However, it is probable that the comparative results for positive and negative appeals were not appreciably altered by such a procedure and it eliminated errors in judgment. The exceptions in spelling which were allowed were "Coco Cola" for "Coca-Cola," "O Henry" for "Oh Henry" and "Palm Olive" for "Palmolive." These variations were as regular as the correct forms of the names and did not seem to alter the meaning of each name.

Results of the recall tests

A summary of the results for the two types of appeals tested is given in table 1. These figures indicate the relative values of positive and negative appeals with respect to recall for each advertisement in each group. The positive and negative results are grouped separately and the columns are totaled for direct comparison.

Interpretation of the data

The total results for the pure recall tests show the negative appeals leading by scores of 624 to 588, an advantage of 6.1 per cent. This difference is offset by the aided recall scores which stand 1080 to 1027 in favor of positive appeals, the advantage being 5.2 per cent. Inspection of the tabulated data reveals no consistent or important advantage favoring either type of advertisement. It would seem that positive and negative appeals do not differ widely in their values with respect to recall, either pure or aided. It follows that there is no significant difference in the sales values of positive and negative advertisements, in so far as sales and recall values are related.

The total pure recall scores for individual advertisements show a range from 16 to 86 for positive appeals and from 16 to 73 for negative appeals. The corresponding ranges in the aided recall scores were 24 to 102 and 32 to 93. Variations in the sizes of the advertisements and in the use of color do not seem to account for the variations in scores within the types of appeals.

The differences must be assumed to lie within the advertisements or in the prominence of the products which were advertised.

The correlation between pure recall and aided recall values

In order to study the relationship between the pure recall and aided recall values the Pearson coefficient of correlation was computed. According to Pearson, the coefficient of correlation $(r) = \frac{\Sigma xy}{N \cdot \delta_x \cdot \delta_y}$, where X represents one variable function, Y the other, N the number of cases and δ the standard deviation. The Ayres method for simple series was employed to reduce the number of computations, using the equation form,[9]

$$r = \frac{\Sigma xy - \frac{\Sigma x \cdot \Sigma y}{N}}{\sqrt{\left(\Sigma x^2 - \frac{(\Sigma x)^2}{N}\right)\left(\Sigma y^2 - \frac{(\Sigma y)^2}{N}\right)}}$$

The probable error of the coefficient was determined by the formula recommended by Odell,[10] probable error (P.E.) = $.6745 \frac{1 - r^2}{\sqrt{N}}$.

It has been previously suggested that pure recall scores were obtained mainly because of their high correlation with aided recall scores. The coefficient of correlation between the total scores for the individual advertisements is $+.68 \pm .07$. This value agrees closely with the .70 correlation quoted from Poffenberger on page 220. The correlation value .68 represents aided recall scores which may have been affected by the pure recall tests preceding, so should not be taken as identical in meaning with the value of .70 above.

The coefficient of correlation between pure recall and aided

[9] Odell, C. W. Educational Statistics, published by the Century Company, 1925. Page 165.

[10] Odell, C. W. Educational Statistics, published by the Century Company, 1925. Page 224.

recall scores for the 15 positive advertisements is $+.64 \pm .10$.[11] Two of the negative advertisements were exchanged for other specimens after the first test. The 13 negative advertisements which were not changed after Test 1 have a correlation value of $+.81 \pm .07$. There appears to be a difference in the relationships between pure recall and aided recall values for the two types of advertisements. Each of the coefficients is for a small number of cases so that the difference of .17 loses some of its significance. The essential fact is that there is a marked positive correlation between pure recall values and aided recall values for both positive and negative appeal advertisements.

Comparison of men and women

Tests 2 and 4 are both for groups of men in elementary psychology classes. The coefficient of correlation between pure recall scores for individual advertisements in these two groups was found to be $+.76 \pm .05$. This close relationship shows the similarity of male groups and indicates a high reliability for the tests. For aided recall the coefficient is $+.89 \pm .03$ indicating an even closer relationship. Test 2 was made in the Spring of 1927 and Test 4 in the Fall of 1927. Since Test 3, which represents a women's class in elementary psychology, was made in the Spring of 1927, it would seem preferable to use Test 2 in comparing the women's scores with those of the men. The high correlations between Test 2 and Test 4 indicate that either would be suitable for comparison with Test 3.

The total pure recall scores indicate that the men have no preference for either positive or negative advertising appeals, since the scores are 105 for each. The women favor the negative slightly by scores of 103 to 93. This difference is nearly eliminated in the case of aid recall since the men favor positive appeals by scores of 202 to 183 and the women's scores are practically even, being 188 to 184 in favor of positive appeals. It appears that both sexes react about equally to positive and negative appeal advertising from the standpoint of recall values.

[11] This P.E. may be too small as the probable error increases rapidly for small values of N.

In pure recall the average number of advertisements correctly listed by each man was (105 + 105)/19 cases or 11.05, compared with (93 + 103)/17 or 11.53 for each woman. In the aided recall tests the averages are (202 + 183)/19 or 20.26 and (188 + 184)/17 or 21.88 respectively. These average values seem to further confirm the conclusion that men and women react very much alike in so far as indicated by recall values for positive and negative appeal advertisements.

The question of individual types

The pure and aided recall scores were first tabulated with complete scores for each individual person. Inspection of these scores did not reveal whether adults can be classified into types favoring either positive or negative appeals. On the assumption that individuals react similarly to both types of appeals, each subject would most probably have an equal or proportionate score for each type. This is best determined by correlating the individual scores for the two types of appeals. The results for the first group of 45 subjects were used, although the tabulated individual scores have been omitted.

The coefficient of correlation between the individual pure recall scores for positive and negative advertisements for the first group was $+.43 \pm .08$. This would seem to be a significant, though not a very close relationship.[12] In the case of aided recall scores the coefficient is considerably higher, $+.71 \pm .05$. Since the process of aided recall most closely resembles the memory function in the buying process, it would appear that individual customers react about equally to positive and negative advertising appeals. The recall values of both types of appeals are approximately equal as indicated by total scores, the range and the correlation between individual scores.

Summary of conclusions on the recall tests

The following conclusions, based on recall scores for positive and negative advertisements, seem to be evident from the results:

1. There is no outstanding advantage favoring either positive

[12] Odell, C. W. Educational Statistics, published by the Century Company, 1925. Page 172.

or negative appeals in advertising as indicated by their relative effectiveness.

2. The differences within positive and negative advertising appeals are of greater importance than the inherent differences between the appeals.

3. Mature people react about equally to both types of appeals and do not fall into groups favoring one type of appeal or the other.

4. Both men and women react about equally to positive and negative advertising appeals, and the two sexes respond with about the same quality of reaction.

5. Pure recall values correlate closely with aided recall values, and can probably be used interchangeably with a fair degree of accuracy.

PART II. WITH CHILDREN

Positive and negative advertising appeals have been found to be about equal in effectiveness. The buying public, most of whom are quite mature, reacts about as readily to either type of appeal when presented under equally advantageous circumstances. The authors found in coupon studies and recall tests that there is ample reason for the present increase in the use of negative advertisements.[13] It was while investigating recall values that a group of high school students was reached. The reactions of the younger folks differed so much from those of the adults that the data were expanded to include 100 subjects. The following is a report of the results of the children's recall tests with positive and negative advertisements.

The sources of data

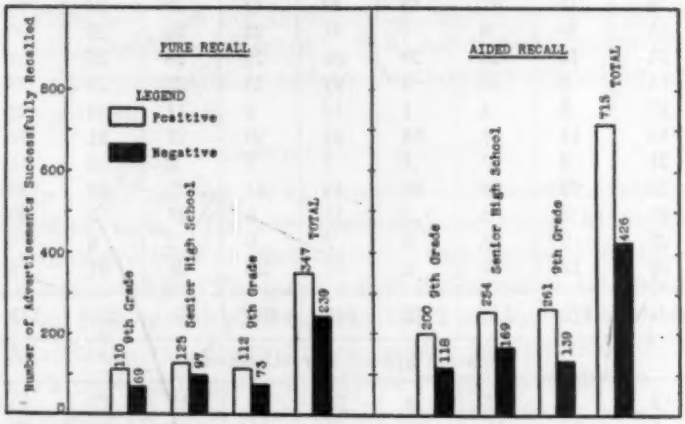
Exactly 100 high school children coöperated in making the tests and were able to follow the procedure with minor exceptions. The groups are described as follows:

[13] Lucas, D. B., and Benson, C. E. The relative values of positive and negative advertising appeals as measured by coupons returned. The Journal of Applied Psychology, June, 1929, vol. xiii, no. 3.

Lucas, D. B., and Benson, C. E. The historical trend of negative appeals in advertising. The Journal of Applied Psychology, August, 1929, vol. xiii, no. 4.

Test No. 1. Ninth grade junior high school boys and girls..	30
Test No. 2. Senior high school boys and girls.....	30
Test No. 3. Ninth grade junior high school boys and girls..	40
Total.....	100

The first group was given the recall test for the purpose of enlarging the data in connection with the adult records. When it was discovered that the reactions of the children differed so widely from those of the adults, it appeared undesirable to group all of the records together. In order to verify the results



Graphic Summary of the Children's Recall Scores for Positive and Negative Advertisements

FIG. 2

of the first high school test and to increase the number of subjects the second and third tests were made. These later results agreed so closely with the first group that the children have been given separate treatment.

Recording the data

It was found that the children made a great number of errors in writing the names of goods. Since it was impossible to distinguish between certain mistakes in spelling and some completely wrong names, all wrongly spelled names were omitted.

TABLE 2

Summary of the results of the high school recall tests for positive and negative appeals in advertising, with scores for individual advertisements

NUMBER OF ADVERTISEMENT	NUMBER OF TIMES ADVERTISEMENT WAS RECALLED CORRECTLY							
	Pure recall				Aided recall			
	Test 1	Test 2	Test 3	Total	Test 1	Test 2	Test 3	Total
Positive appeal advertisements								
1	2	8	12	22	13	19	17	49
3	2	6	2	10	3	9	6	18
5	0	2	1	3	1	4	1	6
7	7	7	13	27	15	22	26	63
9	13	17	13	43	17	29	29	75
11	19	6	6	31	22	24	20	66
13	16	16	20	52	29	28	35	92
15	8	10	4	22	23	25	29	77
17	5	4	1	10	9	11	6	26
19	11	8	15	34	20	27	31	78
21	2	0	1	3	7	2	2	11
23	10	18	16	44	11	20	19	50
25	3	8	2	13	6	11	3	20
27	0	2	0	2	0	2	6	8
29	12	13	6	31	24	21	31	76
Totals...	110	125	112	347	200	254	261	715
Negative appeal advertisements								
2	7	5	6	18	18	15	17	50
4	10	19	20	49	11	23	23	57
6	2	7	1	10	4	11	3	18
8	1	6	2	9	2	6	2	10
10	3	2	0	5	20	8	14	42
12	8	3	3	14	14	15	13	42
14	1	4	4	9	10	17	16	43
16	3	3	2	8	7	9	6	22
18	3	2	6	11	3	3	9	15
20	7	14	8	29	3	9	3	15
22	4	5	2	11	6	13	5	24
24	0	2	3	5	0	1	2	3
26	2	8	7	17	2	8	7	17
28	7	9	5	21	1	11	4	16
30	11	8	4	23	17	20	15	52
Totals...	69	97	73	239	118	169	139	426

In one test group this was found to reduce the scores from 134 positive and 94 negative to 110 and 69 respectively. Apparently errors were as frequent with positive appeals as negative so that the relative values were not materially changed. Such a strict method did eliminate possible errors in the recorder's judgment.

Results of the high school recall tests

A summary of the results of the high school recall tests is given in table 2. These figures indicate the relative values of positive and negative appeals with respect to recall for each advertisement in each group. The positive and negative results are grouped separately and the columns are totaled for direct comparison.

Interpretation of the data

In table 2 the positive appeals show a consistent advantage in all of the tests. The pure recall total scores stand 347 to 239 in favor of the positive advertisements and the aided recall scores stand 715 to 426. The positive appeal values exceed the negative by 45.2 per cent in pure recall and 67.8 per cent in aided recall. Advertisers can discount these results in part since children are a dependent class and do little independent buying. Further analysis of the scores should show their advertising significance more clearly, and may point out certain implications in other fields.

The age differences in recall

Tests 1 and 3 in table 2 are both for 9th grade junior high school classes. The Pearson coefficient of correlation between pure recall scores for individual advertisements in these two groups is $+.61 \pm .08$. For aided recall scores the coefficient of correlation is $+.88 \pm .03$. These coefficients, and especially the latter, show the similarity of the junior high school groups and indicate a high reliability for the tests. Since Tests 1 and 2 were both made near the end of the 1926–1927 school year, Test 1 will be used to compare the junior high school and senior high school results. Test 3 was made at the beginning of the

1927–1928 school year. There were 30 children in Test 1 and 30 in Test 2. In the pure recall tests the average number of advertisements recalled by each subject in Test 1 was 179/30 or 5.97 compared with 222/30 or 7.40 in Test 2. In the aided

TABLE 3

Total results for high school tests on the effects of positive and negative advertising appeals, by sexes

NUMBER OF TEST	NUMBER OF ADVERTISEMENTS CORRECTLY RECALLED						TOTAL SUBJECTS
	Pure recall tests			Aided recall tests			
	Positive	Negative	Total	Positive	Negative	Total	
Boys							
Test 1	60	39	99	128	73	201	21
Test 2	23	16	39	46	18	64	6
Test 3	72	37	109	159	77	236	27
Totals	155	92	247	333	168	501	54
Girls							
Test 1	41	28	69	62	42	104	8
Test 2	38	28	66	75	53	128	8
Test 3	40	36	76	102	62	164	13
Totals	119	92	211	239	157	396	29
Sex not designated							
Test 1	9	2	11	10	3	13	1
Test 2	64	53	117	133	98	231	16
Test 3							
Totals	73	55	128	143	101	244	17
Totals	347	239	586	715	426	1,141	100

recall tests the averages are 318/30 or 10.60 and 423/30 or 14.10 respectively. The senior high school children consistently exceed the junior high school children in numbers of advertisements recalled. The total pure recall scores for positive and

negative appeals stand 110 to 69 in Test 1 and 125 to 97 in Test 2, each favoring positive appeals with relative advantages of 59.4 per cent and 28.9 per cent respectively. For the aided recall tests the scores are 200 to 118 for the junior high school children and 254 to 169 for the senior high school children, favoring positive appeals with relative advantages of 69.5 per cent and 50.3 per cent respectively. It is obvious, therefore, that the memory values for the older group of children approach those of the adults more nearly than do the memory values of the younger children. The older children show less preference for positive appeals. It would seem that the more closely the child's memory ability approaches that of the adult the less the difference in the effectiveness of positive and negative advertising appeals with respect to memory.

Comparison of boys and girls

Table 3 shows the summaries of the results for the boys and girls separately. It will be noted that in Test 2 in the senior high school there were 16 subjects whose sex was not designated. There were two reasons for this. The first reason was that a study of sex differences was not anticipated at the time the test was made. The other reason was that care was taken to avoid asking names and sex in order to insure the children that they were not being personally tested. It was feared that any suspicion or antagonism on the part of the subjects might decrease or otherwise alter the results.

The total pure recall scores for boys favor positive appeals by 155 to 92 and the scores for girls favor positive appeals by 119 to 92. The positive appeal scores exceed those for the negative by 68.5 per cent and 29.3 per cent respectively. The aided recall scores stand 333 to 168 for boys and 239 to 157 for girls, each favoring positive appeals. The relative per cents are 98.2 and 52.2. It is evident that both sexes favor positive appeal advertisements from the standpoint of memory values, the boys rather more so than the girls. This difference may first seem to be the result of some strictly sexual characteristic. However, the age comparisons indicate that this tendency

varies with memory ability, and it will be seen that the girls exceed the boys in average scores.

In the pure recall tests the average number of advertisements recalled by each boy was 247/54 or 4.57 compared with 211/29 or 7.28 for each girl. In the aided recall tests the averages are 501/54 or 9.28 and 396/29 or 13.66 respectively. It is obvious, therefore, that the memory values for the girls approach those of the adults more nearly than do the boys' memory values, since the girls show less preference for positive appeals. The girls' advantage in memory ability seems to be a more logical explanation of their tendency toward the adult type of reaction than any other sex difference. Thorndike reports the memory ability of girls as exceeding that of boys for children from 8 to 14 years.[14] He found that only 40 per cent of the boys exceed the median ability for girls. Such sex differences as do exist seem to resolve themselves into differences in memory ability for children of the same grade, the girls appearing to excel the boys consistently.

Summary of conclusions

The following qualified conclusions seem to be evident from the results of the high school recall tests with positive and negative appeal advertisements:

1. Children of the high school age react more effectively to positive appeal advertisements than to negative appeals.

2. As the mental ability of the child approaches that of the adult, the comparative effectiveness of negative advertisements increases.

a. Older children and pupils in advanced grades show less difference in their reactions to positive and negative appeals than the younger children in earlier grades.

b. Girls show less preference for positive appeals than do boys in the same grades, probably because of their greater memory ability.

3. Despite these differences between the two types of appeals

[14] Thorndike, E. L. Educational Psychology, vol. iii, published by Teachers College, Columbia University, 1925. Page 183.

there appears to be far greater differences within the same type of appeal, not entirely traceable to difficulty in spelling the names.

This admittedly embryonic study of youthful reactions to positive and negative motives suggests in part the truth of the following statement taken from a study entitled, "The Age Factor in Selling and Advertising" made by the Photoplay Magazine.[15]

"As far as it is possible to generalize about so broad a subject, Youth is interested in sports and parties, fun and humor, music and dancing, and romance. *Youth has aspirations of beauty and grandeur.* Youth is profoundly self-occupied with its personal appearance and with its settings as they contribute to its glorification.

"Youth on the other hand is comparatively cold to considerations of the practical; of utility and price, of durability and healthfulness, of moral and ethical qualities. *Youth turns a deaf ear to cautions of protection and fear.*"

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[15] The age factor in selling and advertising. Photoplay Magazine, 1922, page 45.

[16] See also H. Meltzer, The present status of experimental studies on the relationship of feeling to memory. Psychological Review, March, 1930, vol. xxxvii, no. 2, pp. 124–137.

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THE GROWTH OF INTELLIGENCE AS MEASURED BY THE GOODENOUGH DRAWING TEST[1]

MARION L. WILLIAMS

Many divergencies of opinion have developed concerning the nature of the growth of intelligence. The present study seeks to present further evidence on two phases of this question: (1) Does the growth of intelligence progress at a constant or decreasing rate? (2) Are the curves of mental growth for different levels of relative intelligence parallel or divergent?

Reviewing the past work on these problems we find that efforts to solve the problem of growth on the basis of mental age scales and points of raw score have been suggestive but inconclusive because they have failed to express growth in units which are equal at all points of the scale. Such work as Baldwin and Stecher's (4) repeated application of an age scale, however, furnishes valid evidence on the question of variability and indicates that variability increases with increasing age.

A more sound approach to these problems has been made by those who have first attempted to equalize their units of measurement. Arthur (1) and Arthur and Woodrow (3) have done this by their use of the discriminative value of a test as a unit of measurement; Teagarden (11) has expressed her values in terms of the "T" Score; and Thurstone (12), Odom (9), and Stutsman (10) have secured equal units of measurement by the application of Thurstone's method of absolute scaling. These three methods of achieving comparable units of measurement have all shown variability to increase with age, and such growth curves have, with a few exceptions, shown negative acceleration for the upper age range.

[1] The writer is greatly indebted to Professor L. L. Thurstone for assistance in the working out of this problem. This paper is a contraction of a thesis submitted to the University of Chicago in partial fulfillment of the degree of Master of Arts.

The present study is based upon data published by Florence L. Goodenough in her book "The Measurement of Intelligence by Drawings" (7). The test here described consists in requiring the child to draw "a man" and this drawing is then scored by means of an objective scale. The test was standardized on a group of 3593 cases consisting of children aged four to ten years inclusive, drawn from the kindergarten and first five grades of public schools in urban communities.

Goodenough classifies these cases on the basis of school progress as accelerated, normal, and retarded. It was assumed that children entered the first grade between the ages of six and six and one-half years, and those children were considered normal if, when tested, they were within a half year of the grade which they would have reached with normal progress. It will be noted that no four year and few five year children could be classed as accelerated or retarded on a basis of school progress, for on the one hand, four year olds are never admitted to first grade and very few five year olds attain high first grade and on the other hand children of these ages who were below kindergarten level were not tested. At the upper level no ten year olds could be rated as accelerated because testing was not carried on above grade five. This fact also tends to reduce slightly the number of accelerated children of nine years. Because of the unusually large proportion of children classified as retarded, as compared with the numbers of normal and accelerated groups, Goodenough used only the records of the normal group in her final standardization.

Following this original standardization she secured drawings from 2034 additional children in order to check her norms. These children ranged in age from four to twelve years and in grade placement from kindergarten to sixth grade inclusive. The classification method above described was applied to these cases also. The original and check groups thrown together give a total of 5627 cases, classified as shown in table 1.

The norms published by Goodenough are not of use in answering the questions raised in this study, for the various test items have not been scaled in reference to each other, and so the relative difficulty of the items passed at each successive age is

not known. The fact that 6, 8, and 10 year old children normally make scores of 12, 20, and 28 respectively does not necessarily signify that intelligence has increased between these ages in the ratio of 12:20:28.

It is therefore necessary to express the mean scoring ability of children of different ages in terms of a single continuum. This has been accomplished by applying to the raw data mentioned above the scaling method devised by Thurstone. This method is fully explained in his article "A Method of Scaling Psychological and Educational Tests" (12). It depends upon the overlapping of successes on the various test items of the children of adjacent age groups. The percentage of successes on each test item at any given age can be expressed as a proportion of the normal frequency surface of test ability at that age in terms of its own standard deviation. These proportions will be known hereafter as X values.

Assuming as an arbitrary origin the mean of the test performance of the lowest age group and adopting as a unit of measurement the standard deviation of the test performance of this group, this method enables us by means of the X values of each adjacent pair of ages to obtain the means and standard deviations of the performances at each subsequent age level. To accomplish this the following equations were used as given by Thurstone:

$$\sigma_2 = \frac{S_1}{S_2}\sigma_1$$

$$M_2 = \sigma_1\left(m_1 - \frac{S_1}{S_2}m_2\right) + M_1$$

In which M_1 and M_2 = means of the test performances of the upper and lower age groups respectively,

σ_1 and σ_2 = the standard deviations of these groups,

S_1 and S_2 = the standard deviations of the X values of the overlapping ages,

and m_1 and m_2 = the means of the X values.

Before applying this method to a given set of data it is necessary to ascertain that the test performance of each two adjacent age groups can be legitimately expressed as normal distributions on the same base line. The X values of each pair of adjacent ages were therefore plotted, and all show a high degree of linearity. If either distribution of a pair were skewed, such a plot would necessarily be non-linear. This linearity, therefore, illustrates that the two distributions can be represented as normal on the same base line.

As originally described this scaling method gave equal weight to all of the X values. Thurstone has worked out a refinement of this technique (14), by which each of the test items is weighted in accordance with the reliability of the proportion of successes on that item. The reliability of a proportion of a normal probability surface is as follows:

$$\sigma_p = \frac{\sigma}{\sqrt{n}} \sqrt{\frac{pq}{Z^2}}$$

Since the weight should be inversely proportional to the square of the reliability,

$$W = \frac{n}{\sigma^2} \cdot \frac{Z^2}{pq}$$

in which n = number of cases, σ = the standard deviation, and p = the proportion or X value. The values of pq and Z were obtained for each value of p from Kelly's tables (8). Since n and σ remain constant during the scaling of any two consecutive ages, they can be dropped and we have

$$W = \frac{Z^2}{pq}$$

Weighting was accomplished, then, by obtaining the values of $\frac{pq}{Z^2}$ for each of the proportions at the two age levels being scaled, adding these values, and finding the reciprocal of the sum. Each proportion was then multiplied by the resulting weight

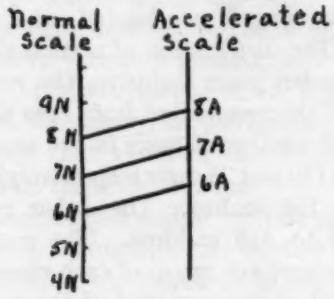
before being substituted in the formulae for the mean and standard deviation.

In this way each adjacent pair of ages was scaled for each of the three classes, normal, accelerated, and retarded, of the original group. The distribution of normal children ranged in ages from four to ten years inclusive, the retarded from ages seven to ten, and the accelerated from ages five to nine. Because of the small number of cases in the accelerated group at ages five and nine (10 and 25 cases respectively) these age groups were omitted in the scaling. The other groups ranged in number from 65 to 515 children. The mean and standard deviation of the lowest age group of each class were adopted as the origin and unit of measurement of the scale for that class. This process, therefore, resulted in a series of means and standard deviations for each of the three classes, as shown in table 2.

Since each of these three classes had been scaled separately, the mean and σ of each of them were measured from its own origin and in terms of its own unit. In order to compare them as to variability between the three groups it was necessary to reduce the three to a common origin and unit of measurement. To accomplish this the normal group was compared with the accelerated and retarded groups by scaling the normal and accelerated and the normal and retarded groups separately for each age. The same scaling process was applied as before with the exception that the proportions were not weighted, as it was felt that the unweighted points would give results sufficiently accurate for the purpose in this case. For each age group the mean and standard deviation of normal four year olds were taken as origin and unit, and the means and standard deviations were worked out for the accelerated and retarded groups. The results of this scaling procedure are shown in table 3, column I.

The problem of linking together the results of the original calculations was not yet solved, however. The nature of this problem can best be demonstrated in the accompanying diagram. The original scaling operations had given us two independent scales, the normal and the accelerated. That is, the

scale distances 6N–7N, 7N–8N, and 6A–7A, 7A–8A, etc., were known. Scaling the normal and accelerated groups had given



the relationships between the accelerated and normal at each age; that is, it gave us the distances 6N–6A, 7N–7A, etc. It was desired to test the consistency of the scaling processes by tying these two results together, that is, by determining whether both methods locate the means of the accelerated scale at approximately the same points. Taking the distances 6N–6A as a basis, the value of 7A was then determined by substituting the proper values from the scaling of the six year and seven year accelerated groups in the previously quoted equation for the mean. The value of the 8A mean was then calculated from the 7A mean as a basis. In a similar way the means of the retarded group were tied to the normal. Table 3, column II shows the results of this procedure for both the accelerated and the retarded groups. It will be seen that the differences between the means as determined by the two scaling procedures are in all cases very slight, in only one case being as great as .07. This appears to be a satisfactory degree of consistency.

With the means of all the groups expressed in terms of a common unit and with a common origin, they can be plotted on the same base line. This has been done in figure 1.

When the standard deviation at each age was plotted against the corresponding mean, as shown in figure 4, the result was practically constant for each of the three classes. Inasmuch as work with other tests has shown variability to increase with the

mean test performance (13), an explanation was sought for this result. It was evident that the division of the population tested into three classes necessarily reduced the variability in any one group, and since the criterion for this division did not operate in the same way at all ages, namely ages 4, 5, and 10, this factor would not operate equally at all ages.

It was therefore felt desirable to determine the variability of the entire population, irrespective of classification. For this purpose Goodenough's data for the total group, comprising both the original and check groups, were used. Scaling was done in terms of total points scored, rather than in terms of individual test items passed. By means of the same scaling procedure previously used, the percentage of children at each age equaling or exceeding a given test score was compared with the percentage of children at the next higher age equaling or exceeding that score. The X values of these proportions, when plotted, in every instance give a satisfactory linearity. The mean score and the standard deviation were thus obtained for each age as given in table 5, and the means plotted against the σ's as shown in figure 6.

STATEMENT OF RESULTS

Since the mean test performance had been determined for each age group in terms of a common unit and measured from a common origin, it is legitimate to plot these means against age in the form of a growth curve. The curves in figure 1 show such plots for the normal, accelerated, and retarded groups. The mean age of all age groups except the four-year-olds fell at the half year interval; that for the latter group fell at four years nine months. Ages are therefore plotted at these points. It will be seen that the curve of normal growth shows definite negative acceleration. A similar curve was plotted with the data for the total group, as shown in figure 2. It is similar in shape to the curve of normal growth in figure 1.

Figure 3 shows the standard deviation of the several age groups plotted against mean age. The curve for the normal group is practically a straight line. Those for the retarded

and accelerated groups show a very slight tendency to rise with increasing age. A similar curve, figure 5, shows the variability of the total group at the several ages. This curve, like the curve of variability for the normal group, is practically a horizontal.

This constancy of the variability at the several age levels is also demonstrated in figure 1, where the mean test intelligence at each age was plotted against the age for each of the three classes, normal, accelerated, and retarded. These three curves progress along parallel lines except at ten years, where the normal and retarded curves show a wider separation.

INTERPRETATION OF RESULTS

It is probable that the curve for a normal group of children on the Goodenough Drawing Test should be even more markedly negatively accelerated at the lower ages than the curve here presented indicates. The mean test performance at the four and five year levels is necessarily slightly too high, for on the one hand subnormal children of these ages are not likely to be found in school or kindergarten where they can be tested; and on the other hand bright children have not yet had opportunity to achieve advancement and so would be classed as normal rather than as accelerated. The growth curve for the total group, besides including this defect, results in means which are too low at the upper levels because of the large proportion of retarded children it included in comparison with the number of normals at these ages.

The curve of normal growth, even as it stands, however, leaves no question as to its general nature, and confirms the findings on a majority of other tests scaled by the same method or by other methods which achieve equality of the units of measurement.

The divergence of the normal and retarded growth curves at the ten year level, shown in figure 1, can not be explained on the basis of the classification of cases, for testing was carried through the fifth grade, and all cases in the normal and retarded groups at this age level are therefore included. This divergence does

not appear when σ is plotted against age for the total group, as in figure 5. This plot shows the variability at ten years practically the same as that at nine years. This result in the case of the original group must therefore be attributed to some peculiarity of selection of this group, the effect of which has been lost with the addition of the check group.

The finding of a practically constant variability between different intelligence levels at all ages is contrary to the results of all previous investigators whose work has been comparable in method to the present study. As was previously mentioned, the first explanation for this result which came to mind lay in the classification of cases. Because of the three-fold classification, variability among normals at any one age would necessarily be lower than would be the case were all classes combined, except at years four and five, where the accelerated and normal children were combined, making for larger variability at these ages. This effect is apparent in figure 3, where the standard deviation of the normal group drops from ages four and five to its lowest point at age six and then gradually and steadily rises to age ten. This rise is, to be sure, very slight, but is nevertheless apparent.

The plot of standard deviation and age for the total group combining all three classes, shown in figure 5, is similar in shape to that of the normal group alone. Since all cases of ages four and five years were included under one classification we would expect no change in the variability at these ages when the classes are combined. At all other ages, however, the combining of the retarded and accelerated with the normal should produce a relatively greater variability. In spite of this, the variability falls from age four to age six, and then rises steadily but very slightly to age eleven. The subsequent marked drop at age twelve is explained by the fact that at this age only 22 normals were tested as against 63 retarded children. This drop can therefore be ignored.

It is conceivable that the nature of the test used might have some bearing upon this question of variability at different ages. The Goodenough Test is a test of the "performance" type; that

is, it is not dependent upon the ability to comprehend or to use language. In this respect it may be compared with the Merrill-Palmer Tests and with Arthur's Point Performance Scale. As previously noted, Arthur's scaling method is such that her results can give us no information on this question of variability. The Merrill-Palmer results, however, show marked increase of variability with increasing age, in contrast to the results of this study.

A third possible explanation of these results lies in Freeman's suggestion that variability is a function of the complexity of the test. Freeman (5) on the basis of raw scores, found increasing variability in the case of single tests, and constant variability with the more complex group tests. If complexity is to be considered as a factor in the problem, however, the results of this study reverse Freeman's conclusions. The Goodenough Test consists of a single performance; the work of Baldwin and Stecher, Teagarden, Odom, Thurstone, and Stutsman have all been done with tests made up of a large number and variety of items. It would be interesting to scale a number of other tests, such as the Pintner-Paterson Tests to see whether or not such results confirm our findings.

Another aspect of the question of variability is brought out by Thurstone in "The Absolute Zero in Intelligence Measurement" (13) in which he shows that the "absolute variability in test intelligence of different age groups is proportional to their absolute mean test intelligence." This relationship, of course, does not hold in the case of the Goodenough data, where variability remains constant while mean test intelligence increases, as shown in figures 4 and 6. But if this line of relationship remains horizontal, if it does not approach and meet the base line of the means, we would have the absurdity of a variability at the absolute zero of test intelligence which is greater than the mean intelligence of the group.

The nature of this function might be traced further at the lower end of the scale by giving the test to children under four years of age. The Goodenough scale contains a number of items on which there are large proportions of successes at four

years, and on which children of three years might be expected to succeed. It would be interesting to learn whether such an extension of the scale would show a sudden drop in variability or whether this would persist in its horizontal tendency.

CONCLUSIONS

The application of Thurstone's method of absolute scaling to the Goodenough Drawing Test has shown that, as measured by this test:

1. Mental growth increases by decreasing amounts with advancing age. This result is confirmed by the work of the majority of those other investigators who have plotted equal units of mental growth against age.

2. The development of children at different relative intelligence levels progresses along parallel lines. This is contrary to the results of other similarly scaled tests, which have shown diverging lines of progress at different intelligence levels. This difference may perhaps be accounted for by the fact that the Goodenough test differs in its nature from other tests cited in that it depends upon a single type of performance and is independent of language ability.

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TABLE 1

Classification of total cases—original group and check group combined

	ACCELERATED	NORMAL	RETARDED	TOTAL
Original group	258	2,306	1,029	3,593
Check group	154	1,445	435	2,034
Total	412	3,751	1,464	5,627

TABLE 2

Original group—means and standard deviations at successive ages for the normal, accelerated, and retarded classes

The M and σ of each class are expressed in terms of the lowest age group of its class.

	AGE						
	4.7	5.5	6.5	7.5	8.5	9.5	10.5
Normal group							
σ	1.00	.9512	.8709	.8838	.9163	.9990	1.0534
M	0.00	.4854	.9380	1.2961	1.5935	1.8725	2.2388
Accelerated group							
σ			1.00	.9979	1.1489		
M			5.00	.4415	.8311		
Retarded group							
σ				1.00	1.0566	1.0660	1.2717
M				0.00	.3049	.6166	.7699

TABLE 3

Original group—comparison of two methods of determining the M and σ values of the accelerated and retarded groups in terms of the M and σ of the four year normals

	(I)	(II)	(III)
	ACCELERATED SCALED WITH NORMAL	ACCELERATED SCALED WITH ACCELERATED BY AGES	DIFFERENCE
M_{6A}	1.2280		
σ_{6A}	.8391		
M_{7A}	1.6157	1.5984	.0173
σ_{7A}	.8074	.8373	.0299
M_{8A}	1.9270	1.9253	.0017
σ_{8A}	.9156	.9640	.0484
	RETARDED SCALED WITH NORMAL	RETARDED SCALED WITH RETARDED BY AGES	DIFFERENCE
M_{7R}	.9633		
σ_{7R}	.8695		
M_{8R}	1.3002	1.2285	.0717
σ_{8R}	.8137	.9187	.1050
M_{9R}	1.5126	1.4995	.0131
σ_{9R}	.8869	.9269	.0400
M_{10R}	1.6116	1.6328	.0212
σ_{10R}	1.0375	1.1058	.0683

Subscripts 4, 5, 6, etc., refer to ages.
Subscripts A and R refer to accelerated and retarded.

TABLE 4

Original group—means and standard deviations at sur essive ages for the normal, accelerated, and retarded classes expressed in terms of the M and σ of the four year normal group

AGE	NORMAL		ACCELERATED		RETARDED	
	M	σ	*M*	σ	*M*	σ
4.7	0.00	1.000				
5.5	.4845	.9512				
6.5	.9380	.8709	1.2280	.8391		
7.5	1.2961	.8838	1.5984	.8373	.9633	.8695
8.5	1.5935	.9163	1.9253	.9640	1.2285	.9187
9.5	1.8725	.9990			1.4995	.9269
10.5	2.2388	1.0534			1.6328	1.1058

TABLE 5

Total cases—means and standard deviations at successive ages

AGE	σ	*M*
4.7	1.00	0.000
5.5	.9175	.8177
6.5	.9059	1.6487
7.5	.9333	2.2533
8.5	1.0266	2.7868
9.5	1.1200	3.3075
10.5	1.1713	3.6924
11.5	1.2019	4.1369
12.5	1.0416	4.0308

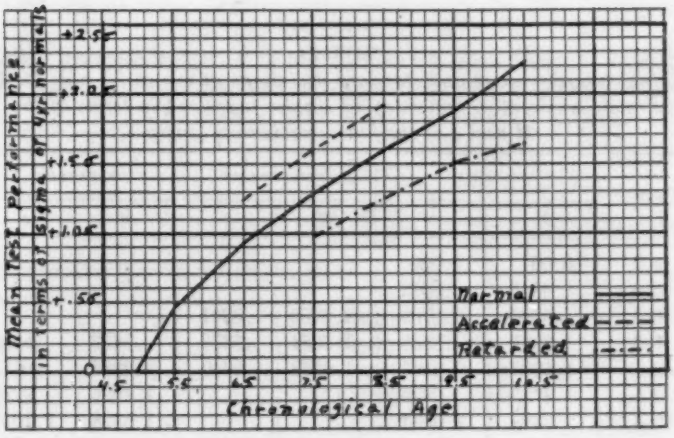

FIG. 1. ORIGINAL GROUP. CURVES OF MENTAL GROWTH SHOWING RATES OF DEVELOPMENT OF ACCELERATED, NORMAL, AND RETARDED CHILDREN

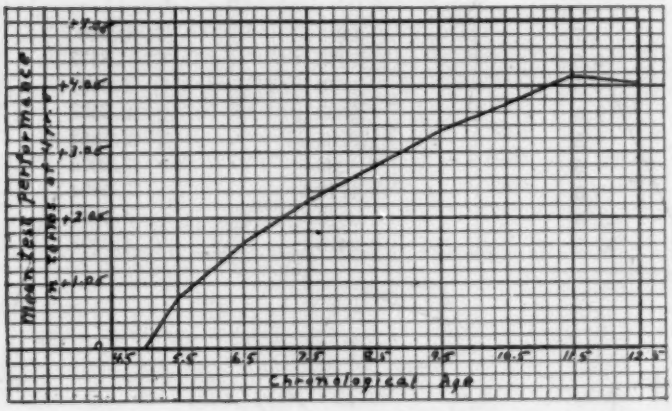

FIG. 2. TOTAL GROUP. CURVE OF MENTAL GROWTH FOR ACCELERATED, NORMAL, AND RETARDED CHILDREN COMBINED

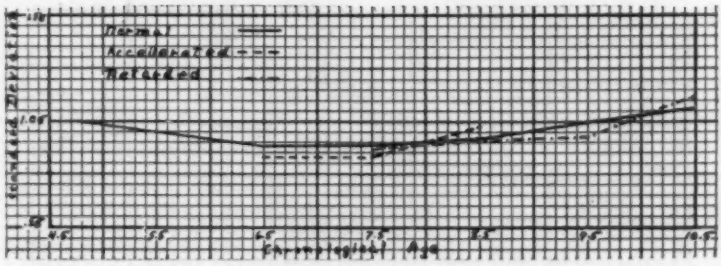

FIG. 3. CURVES SHOWING RELATION OF STANDARD DEVIATION TO AGE FOR NORMAL, ACCELERATED, AND RETARDED CHILDREN. ORIGINAL GROUP

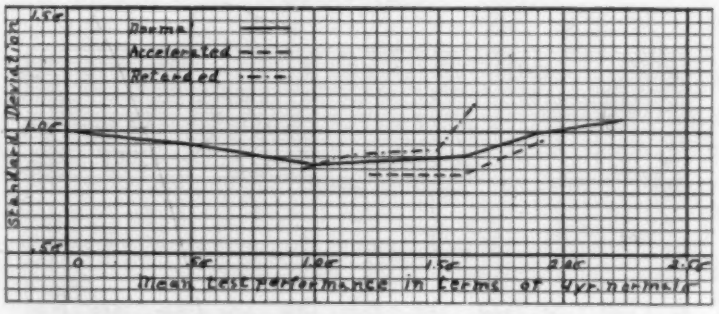

FIG. 4. CURVES SHOWING RELATION OF STANDARD DEVIATIONS TO MEAN TEST PERFORMANCE FOR NORMAL, RETARDED, AND ACCELERATED CHILDREN. ORIGINAL GROUP

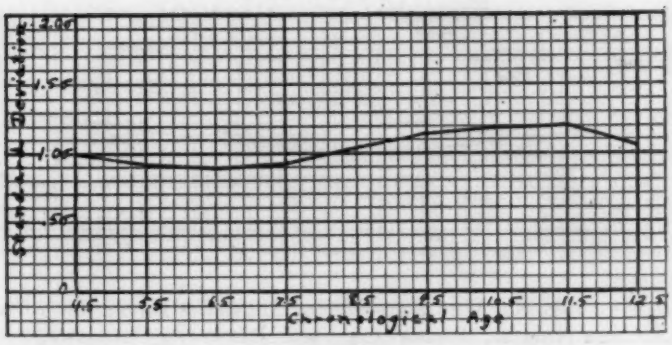

FIG. 5. CURVE SHOWING RELATION OF STANDARD DEVIATION TO AGE. TOTAL GROUP

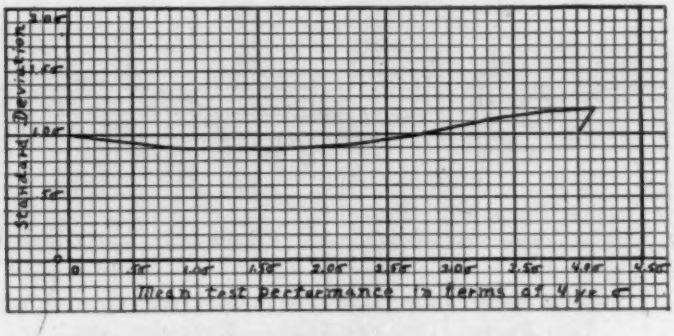

FIG. 6. CURVE SHOWING RELATION OF STANDARD DEVIATION TO MEAN TEST PERFORMANCE. TOTAL GROUP

EFFECT OF MENTAL AGE ON FOREIGN LANGUAGE ACHIEVEMENT

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Long Beach Junior College, Long Beach, California

It is important at times to know not only what score upon a standardized test a student in a certain grade should make, but also *what score he ought to attain for a pupil of his mental age.* Only through such knowledge can the teacher determine scientifically whether or not the individual is actually achieving up to capacity. Obviously, such knowledge cannot be obtained objectively without the establishment of what may be termed "mental age norms" for academic achievement. To date the concept of such criteria is still new to the measurement field. Only in two branches of schoolwork—history and foreign language—has the idea so far been practically applied.[1] The writer is possibly the first to introduce the concept to the measurement of pupil achievement in Spanish. Tables 1 and 2 summarize separately by semester and sex the mental age[2] norms, based upon approximately a thousand cases,[3] for vocabulary comprehension as measured by the Contreras-Broom-Kaulfers. *A Test of Spanish Vocabulary*; while tables 3 and 4 report comparable data for *A Silent Reading Test in Spanish.*[4] From these tabulations the instructor can tell at a

[1] Ely-King American History Tests. Research Service Company, Los Angeles, California.

Broom-Brown French Silent Reading Test. Research Service Company, Los Angeles, California.

[2] M.A.'s as yielded by the *Terman Group Test of Mental Ability.* World Book Company, Yonkers-on-Hudson, New York, 1927, Forms A and B.

[3] Data selected from eight semesters of Spanish in eighteen junior and senior high schools of San Diego and Los Angeles, California.

[4] Contreras-Broom-Kaulfers: *A Test of Spanish Vocabulary* and *A Silent Reading Test in Spanish*; Public School Publishing Company, Bloomington, Illinois, 1927. Forms A, B, and C.

glance what degree of mental maturity ordinarily accompanies a certain score through the successive semesters of work; or,

TABLE 1

Mental age norms for Spanish vocabulary: Girls

VOCABULARY SCORE	NUMBER OF SEMESTERS OF SPANISH COMPLETED															
	1		2		3		4		5		6		7		8	
	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.
0–9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10–19	2	13–6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20–29	10	15–8	4	14–10	—	—	—	—	—	—	—	—	—	—	—	—
30–39	17	15–2	20	15–4	3	14–9	1	16–0	—	—	—	—	—	—	—	—
40–49	29	15–5	57	15–9	18	15–4	7	16–5	—	—	1	14–1	—	—	—	—
50–59	9	16–4	73	16–4	56	16–5	39	16–6	2	16–3	3	15–2	—	—	1	19–3
60–67	3	17–8	17	16–5	42	17–3	74	17–1	49	17–3	25	17–11	3	18–0	7	18–7

— indicates no cases. No. = number of cases. Md. M.A. = median mental age.

TABLE 2

Mental age norms for Spanish vocabulary: Boys

VOCABULARY SCORE	NUMBER OF SEMESTERS OF SPANISH COMPLETED											
	1		2		3		4		5		6–8	
	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.
0–9	1	14–7	—	—	—	—	—	—	—	—	—	—
10–19	—	—	—	—	—	—	—	—	—	—	—	—
20–29	8	15–9	2	15–2	—	—	—	—	—	—	—	—
30–39	28	15–8	18	16–3	4	16–0	1	16–7	—	—	—	—
40–49	21	15–3	40	16–5	11	15–8	6	17–1	—	—	—	—
50–59	13	16–0	54	16–11	43	17–1	23	17–0	3	16–9	1	16–10
60–67	4	17–0	9	17–5	25	17–3	49	17–4	40	17–4	22	17–1

— indicates no cases. No. = number of cases. Md. M.A. = median mental age.

conversely, what score should be achieved in a particular term by a pupil of a given mental age.

It is not to discuss the practical applications of these findings, however, which is the original aim of the present writing. The

TABLE 3

Mental age norms for silent reading ability in Spanish: Girls

SILENT READING SCORES	NUMBER OF SEMESTERS OF SPANISH COMPLETED													
	1		2		3		4		5		6		7-8	
	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.
0-2	2	14-10	—	—	—	—	—	—	—	—	—	—	—	—
3-5	7	15-7	4	18-8	1	15-6	—	—	—	—	—	—	—	—
6-8	22	15-9	28	15-11	2	15-9	2	16-4	—	—	—	—	—	—
9-11	16	15-5	46	15-11	24	15-0	10	15-5	3	16-8	1	16-11	—	—
12-14	7	16-0	48	16-2	42	16-9	36	15-4	11	16-1	4	16-0	5	16-2
15-17	5	17-8	36	16-4	37	16-10	56	17-0	34	17-2	9	17-8	10	18-9
18-20	1	19-10	1	18-4	16	17-4	13	17-8	9	17-7	14	18-0	3	18-4

— indicates no cases. No. = number of cases. Md. M.A. = median mental age.

TABLE 4

Mental age norms for silent reading ability in Spanish: Boys

SILENT READING SCORES	NUMBER OF SEMESTERS OF SPANISH COMPLETED											
	1		2		3		4		5		6-8	
	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.	No.	Md. M.A.
0-2	2	14-0	—	—	—	—	—	—	—	—	—	—
3-5	11	14-8	1	18-2	—	—	—	—	—	—	—	—
6-8	18	15-8	18	16-2	5	15-0	1	19-3	—	—	—	—
9-11	15	15-7	23	16-4	21	16-9	3	17-4	—	—	1	16-8
12-14	10	15-7	36	16-8	39	16-9	17	15-11	5	16-5	3	17-4
15-17	6	16-8	24	16-10	17	18-0	42	17-10	29	17-4	13	17-5
18-20	1	17-7	2	17-2	2	19-4	12	16-8	11	17-4	10	17-2

— indicates no cases. No. = number of cases. Md. M.A. = median mental age.

primary purpose of the report is to analyze certain fundamental tendencies in the trend of mental influence upon foreign language achievement which the foregoing data reveal. For

convenience, these tendencies are illustrated graphically in charts 1, 2, 3, and 4.

The most significant fact revealed in tables 1 and 2, and their corresponding graphs, is the perceptible rise in mental maturity which accompanies successive increments of increase in vocabulary. This trend is less obvious in the first semester than in those following, and less consistent for boys than for girls. A definite correspondence of increase is registered by the latter in all terms beyond the first; by both sexes in semesters 2, 5, and 6; and by the boys in the second term, and in both semesters of the third year. The deviations occurring in the beginning term are to be interpreted rather as evidences of a poor classification of pupils than as inherent characteristics of the trend itself. They may easily be attributed, for example, to the presence in the beginning classes of the senior high schools of an appreciable number of students who have completed one or more semesters of Spanish in the eighth and ninth grades, but who, having failed to achieve advanced standing in the language, are repeating it in their sophomore year. This group might well be expected to excel in extent of vocabulary students of even greater maturity just beginning Spanish. The general irregularity and inferiority of achievement in vocabulary of the boys as compared with the girls is in keeping with tendencies already noted by the writer in previous connections, and is in all probability to be explained on the basis of a lack of appeal of foreign language courses to masculine taste.[5]

Very similar trends to the foregoing are revealed by the mental age norms for silent reading in tables 3 and 4. The same student personnel as that involved in the study of vocabulary

[5] See for example:

Walter Kaulfers: "Intelligence of One Thousand Students of Foreign Languages;" in *School and Society*; vol. 28, no. 724, pp. 597–599 (November 10, 1928).

Walter Kaulfers: "The Prognostic Value of General Language;" in *School and Society*; vol. 28, no. 726, pp. 662–664 (November 24, 1928).

Walter Kaulfers: "Mental Selection in the Foreign Languages;" in *Hispania*, vol. 11, no. 6, pp. 505–510 (December, 1928).

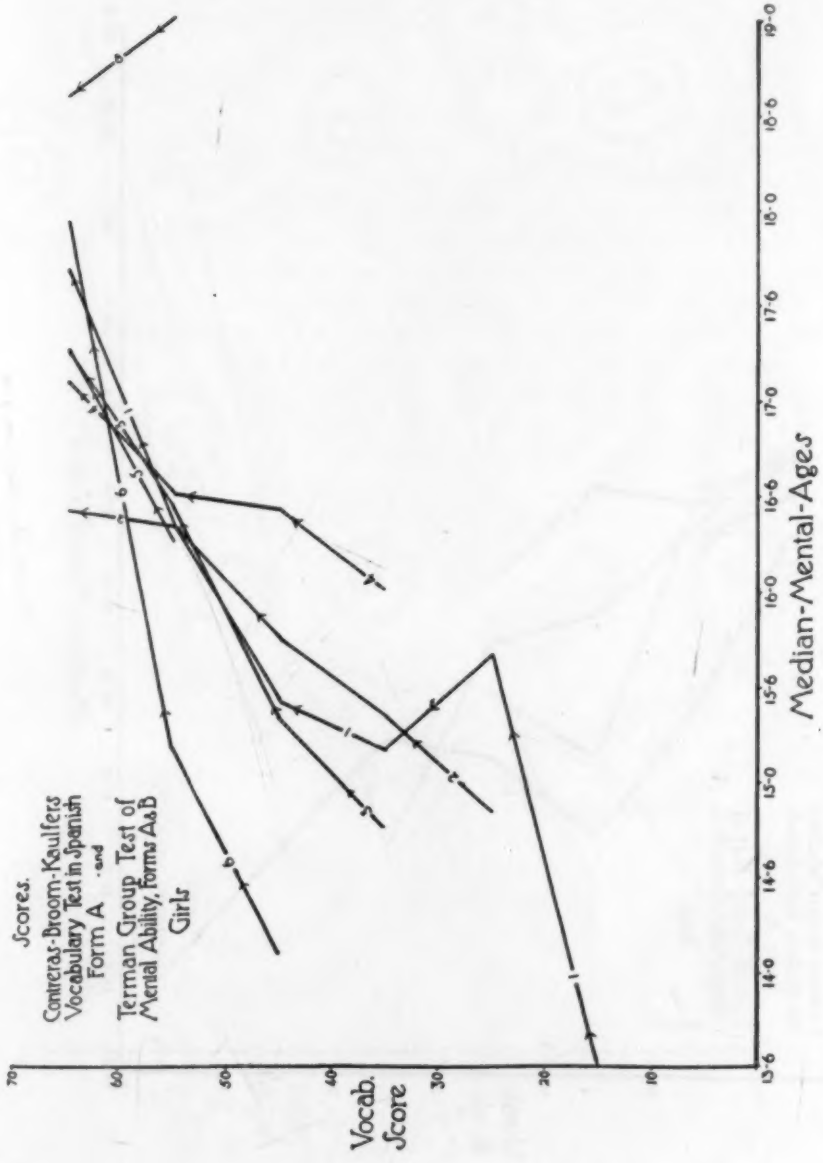
Scores.
Contreras-Broom-Kaulfers Vocabulary Test in Spanish Form A ... and
Terman Group Test of Mental Ability, Forms A & B
Girls
Vocab. Score
70
60
50
40
30
20
10
13-6
14-0
14-6
15-0
15-6
16-0
16-6
17-0
17-6
18-0
18-6
19-0
Median-Mental-Ages

CHART I

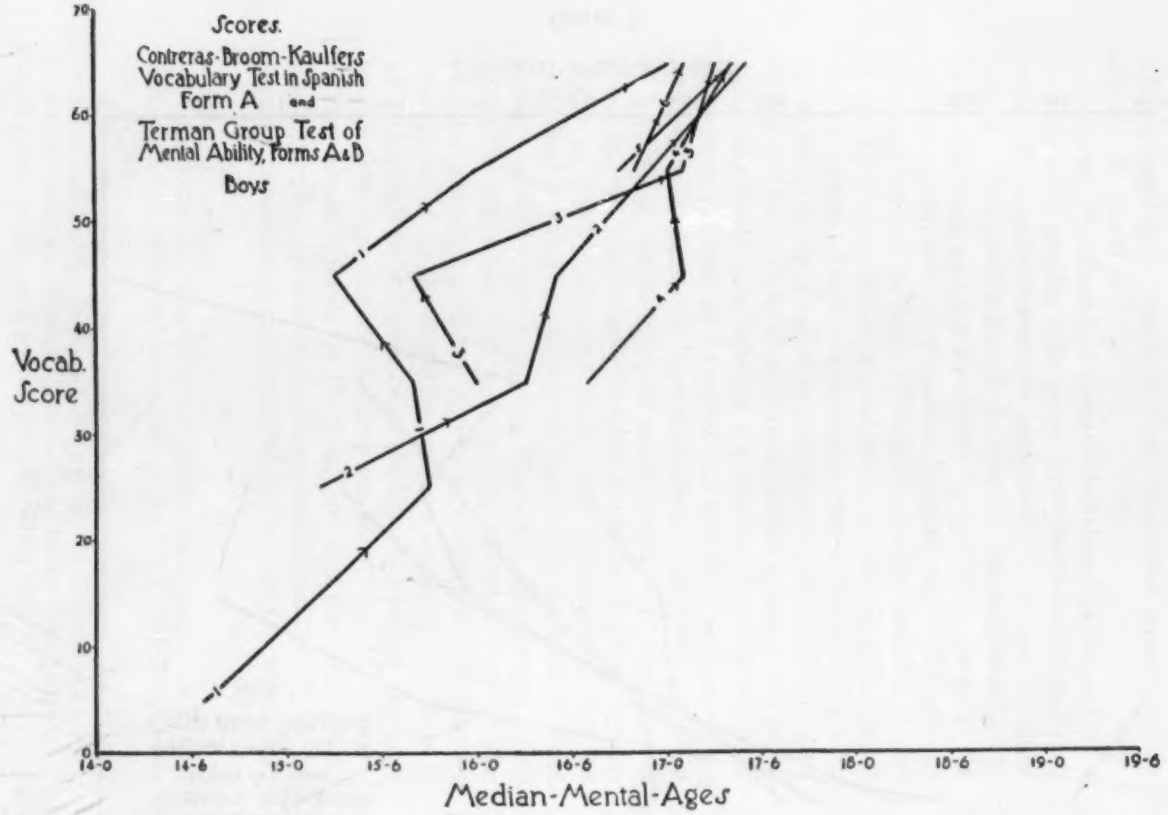
Scores.
Contreras-Broom-Kaulfers
Vocabulary Test in Spanish
Form A and
Terman Group Test of
Mental Ability, Forms A & B
Boys
Vocab.
Score
70
60
50
40
30
20
10
0
14-0
14-6
15-0
15-6
16-0
16-6
17-0
17-6
18-0
18-6
19-0
19-6
Median-Mental-Ages

CHART II

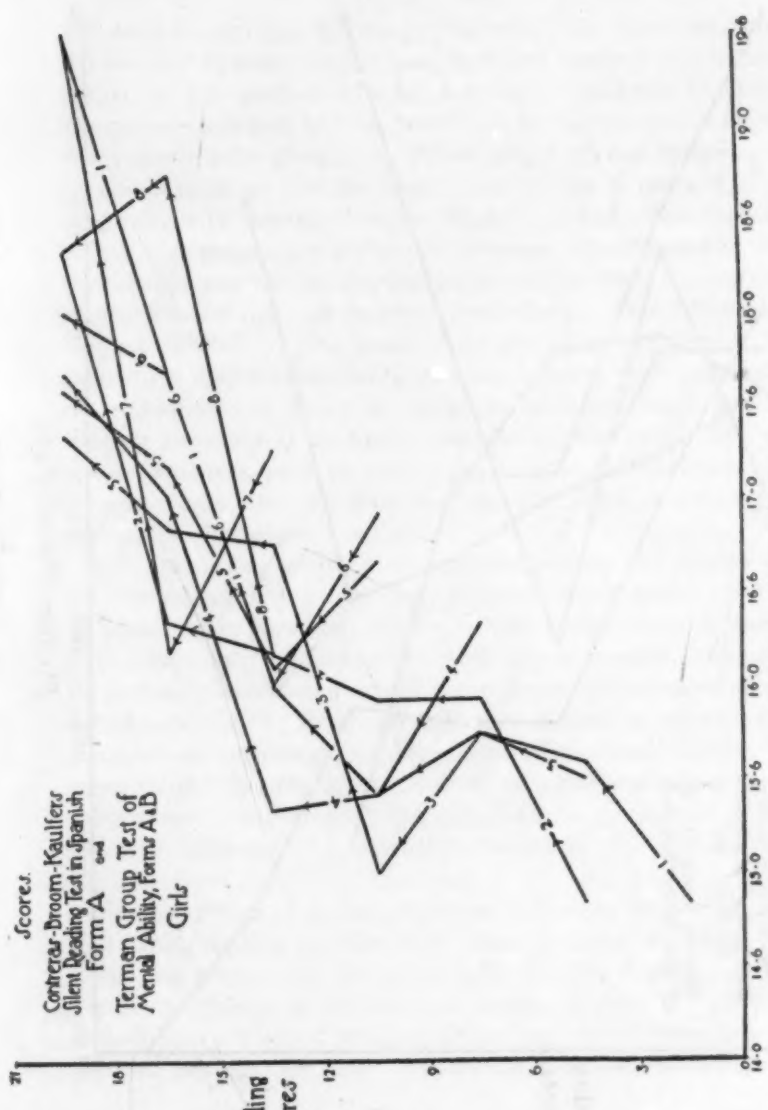
Scores
Contreras-Broom-Kaulfers Silent Reading Test in Spanish Form A
and
Terman Group Test of Mental Ability, Forms A&B
Girls
Reading Scores
Median-Mental-Ages
14-0
14-6
15-0
15-6
16-0
16-6
17-0
17-6
18-0
18-6
19-0
19-6

CHART III

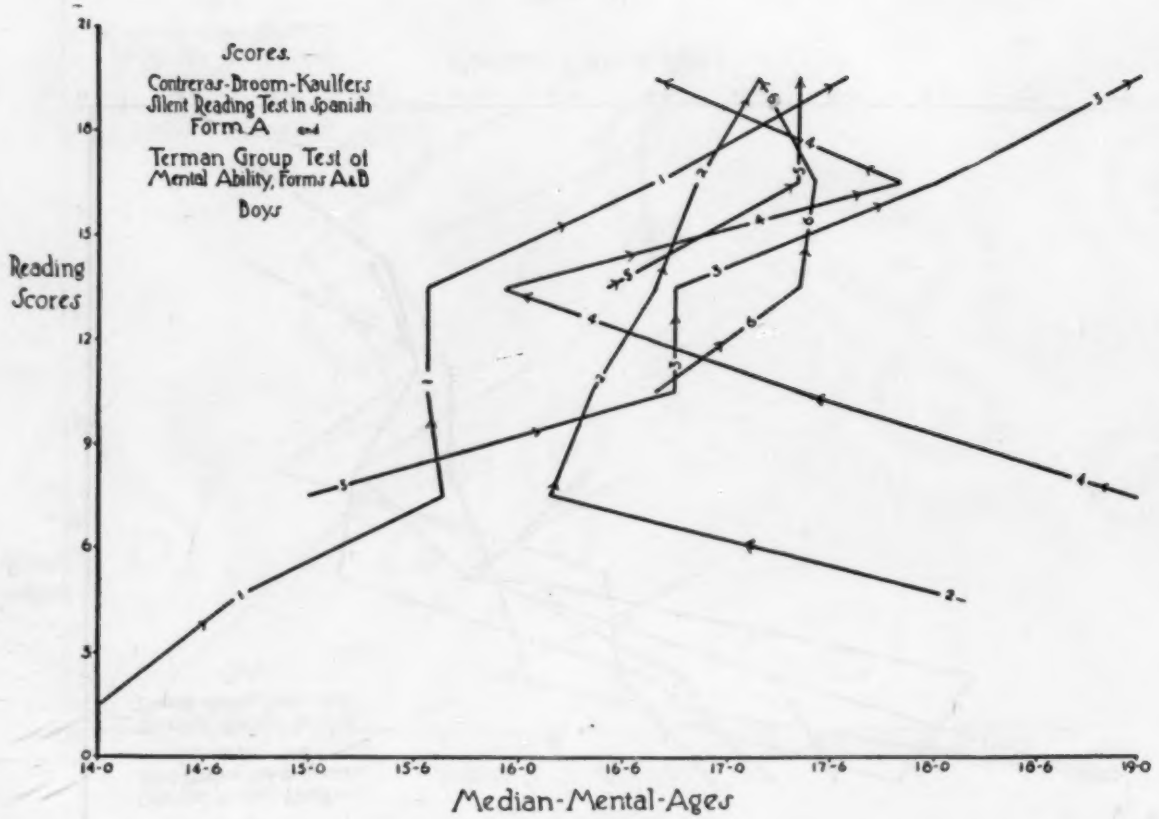
Scores.
Contreras-Broom-Kaulfers Silent Reading Test in Spanish Form A
Terman Group Test of Mental Ability, Forms A & B
Boys
Reading Scores
21
18
15
12
9
6
3
0
14-0
14-6
15-0
15-6
16-0
16-6
17-0
17-6
18-0
18-6
19-0
Median-Mental-Ages

CHART IV

was used in deriving the reading norms. The discrepancy in the number of cases for the semesters and totals is due to the failure on the part of a small number of students, through absence or tardiness, to take both tests on the successive days when these were given. A critical study of the tables and graphs reveals as for the vocabulary norms a marked correspondence of increase between mental age and silent reading ability. A perceptible difference, however, is registered in the first semester in the greater consistency of the trend for reading comprehension than for range of vocabulary. This difference, being exhibited by the same class groups, is significant as indicating that *mental ability possibly operates more effectively as a conditioning factor in composite activities involving the complex responses of perception, association, and recall, than in simple processes, such as vocabulary building, which depend in the main only upon the exercise of the memoritor functions for their automatization and control.*

The increasing number of irregularities in the degree of correspondence beyond the first semester which might readily be construed to invalidate this hypothesis tends instead to show that *what is actually learned in the language becomes from year to year as important a conditioning factor in achievement as intelligence itself.*[6] Practically all inconsistencies beyond the second term may be explained, in view of the small number of cases committing them, on the basis of a difference in general achievement produced by dissimilarities in courses of study followed, differences in instruction received, or inequalities in the amount of application exercised.

Further points of analogy between the norms for vocabulary and silent reading are the wide range of achievement in the beginning terms, and the appreciably greater maturity, with minor exceptions, of the boys as compared with the girls at almost every level of reading ability and in all semesters of Spanish beyond the first. *Apparently a higher mental age is*

[6] Walter Kaulfers: *Prognostic Value of the I.Q. in Spanish.* Stanford University Thesis, 1928, 243 pages; Chapters IV, V, and XII.

required of boys than of girls to achieve on the same level in the language. This condition points as before to a general inferiority of achievement among the male students. Attention should also be called to the presence in the first semester of an appreciable number of pupils who achieve as high scores in both silent reading and vocabulary as students in the third and even fourth years. In view of the substantial similarity of mental ages in the groups compared, this fact seems to indicate that *extent of achievement in Spanish is not merely a matter of number of semesters of work completed but of general intelligence as well.*

Finally, of more than incidental interest is the singularly heterogeneous ability-grouping of pupils in the beginning classes. A fair concept of the extent of mal-classification can be obtained from the fact that each of the maze-like ramifications of the graphs should theoretically, if the grouping were ideal and every student worked up to capacity, be a straight-line transversal, crossing the charts diagonally from left to right—each parallel and approximately equal in length to every other, but successively transposed to slightly higher level of ability. Glancing at the graphs, one cannot but wonder how teachers can conduct successfully classes in which there is a range in mental maturity of more than five years; or how courses of study can be constructed to appeal to such a diversity of mental ages in the beginning years. No wonder the per cent of failure continues high in the foreign languages! Shall we never learn that ability grouping is as essential in the elective studies as in the required subjects of the curriculum?

In all justice to the cities from which data were obtained it must be admitted that pupil classification is often difficult in small schools, and even in large institutions with small foreign language enrollments; and that most schools which supplied data actually attempt ability grouping. The fact, however, remains that the personnel of first year classes is far from homogeneous, and that the rate of mortality among

beginners is still high.[7] This circumstance merely demonstrates the fallacy of the common practice of using the IQ rather than the M.A. as a basis for classifying entering students. If any practical suggestion for the elimination of this difficulty can be offered on the basis of the present findings, it is that all beginning pupils be grouped according to their mental ages—never according to their IQ's; and that beyond the first semester classification be according to ability acquired in the subject itself, as measured by teachers' grades, supplemented by scores upon objective, standardized tests.

These observations, together with those presented earlier in the discussion, seem to justify the following conclusions:

1. That intelligence conditions achievement in Spanish as measured by scores upon standardized tests of vocabulary and silent reading.

2. That the foundation gradually acquired in the language itself increasingly becomes as significant a factor as intelligence in conditioning achievement in Spanish.

3. That boys as a group achieve less in proportion to mental ability—a fact pointing toward inferior habits of study and application, such as might readily be induced by a sex difference in language interest, or by a lack of appeal of Spanish courses to masculine taste.

4. That the normal trend of mental influence upon achievement is often lost amid irregularities in the classification of pupils.

5. That intelligence is a more effective conditioning factor in composite activities involving the complex responses of perception, association, and recall, than in simple processes, such as vocabulary building, which depend in the main only upon the exercise of the memoritor functions for their acquisition and control.

[7] Committee Report: "Foreign Languages in the Junior High Schools in *California Quarterly of Secondary Education*, vol. 2, pp. 366–368 (June, 1927), and in *The Modern Languages Forum*, vol. 12, pp. 13–18 (October, 1927).

6. That range of achievement in Spanish is not merely a matter of semesters of work completed, but of general intelligence as well.

7. That the M.A. rather than the IQ should be taken as the basis for grouping beginning foreign language students; and that classification beyond the first semester should be on the basis of ability acquired in the language itself, as measured by teachers' marks and objective test scores.

BLINDNESS IN FICTION[1]

A Study of the Attitude of Authors towards Their Blind Characters

JESSICA L. LANGWORTHY

Perkins Institution and Massachusetts School for the Blind

"Blindness is an inconvenience," said one courageous man without vision. So it is and one of the greatest from which mortal man can suffer. But to a high-spirited person thus handicapped a greater trial still is the attitude of the world of men towards his deprivation.

If a person without sight is normal in his relations to others, capable of taking care of himself, clever in making the most of his remaining faculties,—and there are many such,—people attribute to him marvelous qualities, call him "wonderful," think some mysterious sort of compensation has been made him on account of his lack of vision. If he belongs to the incapable and weak-willed classes who live upon the economic fringe of life, the added handicap of blindness will probably send him to the charity organizations, but the fact of his natural economic level will not be considered. He will only be thrown the bone of contemptuous pity with the remark, "Poor fellow, he cannot help it, he is blind," and the fact of his lack of sight will bear the whole burden of his misfortunes. Similarly, among that pitiful class, the blind feeble-minded, the determining handicap is evidently the feeble-mindedness, but by nine persons out of ten all his defects will be attributed to his blindness. If he is of the amiable and retiring type it is said that, "The blind are naturally good and pious." If he is fortunate enough to be gifted musi-

[1] Written as a thesis for N1, The Education of the Blind, Harvard Graduate School of Education, January, 1925. Rewritten, May, 1929.

cally it is remarked that "The blind are natural musicians." It is hard for seeing persons to realize how unfortunate and unfair these attitudes are. Few people learn to think of normal persons without sight as merely men and women in the dark, with all the differences of disposition, ability and temperament that the seeing have. Few realize that the term "the blind" is no more an accurate classification than its opposite "the seeing."

No matter what the blind person's talents or lack of them are, all that he does, whether good or ill, is a result, in the minds of most people of his handicap. This is most discouraging to our capable and courageous blind friends. It takes from them all credit for making the most of the things that remain, of overcoming their obstacles, and of becoming as many do thoroughly normal-minded men and women. In N. S. Shaler's book, *The Neighbor*, the author says that the primitive man in us dreads and fears anything strange or different from ourselves. Much of the dislike of foreigners or of men of alien race is to be accounted for in this way. This instinctive shrinking, repugnance, or dislike gives way when we come in contact with the stranger, learn to know him, and try to help him. In a somewhat similar way, perhaps, persons who do not often come in contact with blindness shrink from the condition and misunderstand the one bearing it. Persons who do not see are comparatively few in number, possibly one in fifteen hundred of our population. Many men and women seldom meet a non-seeing person and when they do, treat him with a lack of consideration that is sometimes tragic. Not only socially but economically the mistaken notions of the public make life difficult for the educated blind person. So true is this that far-sighted superintendents of schools for the blind say that there are two phases of the education of the blind; one of the children who come to our schools,—a comparatively easy and interesting task,—and the other of the public, who should receive them and give them a chance to show what they can do in the work-a-day world as they do other young graduates. Their field of possibilities of employment will be more limited than that of seeing persons but there is much they can do if given the chance. This second

phase represents a very difficult undertaking and the discouragements are many; nevertheless teachers of the blind owe it to their students to do all that is possible.

Works of fiction reflect these attitudes of the general public. Many authors, like other persons, have shown an interest in the handicap of blindness. Unfortunately it is not always an intelligent or helpful interest. In the special library of blindiana at the Perkins Institution for the Blind, there are 311 titles of straight fiction, besides magazine articles, religious stories, old comedies, poetry, and the like, in all 442 titles, each containing a blind character. They were written by seeing people out of their belief of what non-seeing people should be and do. The best criticisms of them come from blind people who have first-hand knowledge. The number of titles indicates that the handicap of blindness is interesting to writers and that they think it will be to their readers. The kind of interest manifested is still more suggestive than the fact of it. To many a world without light, color, the far view, is an unbearable and even an uncanny place, and it is inconceivable to them that any one can live a life even approaching normal, shut in by the limitations that accompany the loss of the "queen of the senses." The characters of their books show their distorted outlook. Sometimes the blind characters are studied with a degree of care and show some information about the ways of blind people, but usually they embody the feelings of the author,—as of the general public,—of pity, awe, or idealization of an unknown and little understood condition. Since the blind are already a misunderstood class, each new work of fiction sent out to a credulous public with an unfortunate presentation of a blind character adds to the burden of misunderstanding and, naturally, the abler and more interesting the book is the more harm it can do to persons already struggling with a major handicap.

On reading these numerous works of fiction, not from the point of view of interesting or artistic stories but as a study of the blind characters described in them, we find in general four sorts of blind persons: the idealized and abnormally good; the repugnant and abnormally bad; the extremely clever; and the

normal and well-described. To this classification might be added a fifth, partaking of the qualities of the ones already mentioned, but rather different in spirit, the readjustment of the newly blinded to their condition, including a recent interest, the war-blinded, who are usually described with considerable sympathy and insight. The lines drawn among these divisions are not altogether sharp and exclusive, characteristics of one type sometimes being found in another. Comparatively few books may be taken as instances of the general attitudes of authors towards the blind.

The idealized blind person more or less well portrayed occurs most often. Here we find that authors,—as well as others,—both over-estimate and under-estimate the perceptions and abilities of those who do not see.

In *Blind Sight* by B. Y. Benediall, we have a blind girl as heroine. For blindness of such short duration, Ursula is rather too skilful for reality. It takes time to recover from such an accident as hers had been, and the rehabilitation takes still longer, yet we find her using a typewriter readily and reading braille fluently. These useful helps as well as her writing board, "a rule fitted in grooves, for regulating the lines" (p. 96) show that the author had some knowledge of such contrivances, but the arrangement of her room with its chairs running on sunken rails (p. 105) is not true to a blind person's needs. Neither do blind girls like to have their rooms bare of pictures and other ornamentation. They are more likely to wish to have them like other girls' rooms. Blind persons crave above everything to do as seeing people do, not to be different. Why should Ursula ever have needed "guiding cords from the ceiling" (p. 106) and how would they have helped her? The rest of the house is not arranged on this plan and Ursula is by no means confined to her room. Teachers of the blind believe that as few special helps as possible should be used in the education of blind pupils since they will not have such aids when they leave school. Her friends conspire to keep unpleasant things from her that she may be as happy as possible. Since she is a lover of sincerity this lack of truthfulness in her friends is revolting to her and she

suffers from it more than from her lack of sight. The author properly estimates this as one of the chief tragedies of blindness. Never try to deceive a person without sight. You will not succeed long and he, if any one, is entitled to the truth. Deception however well meant is wrong. In general the attitude of Ursula's friends adds to the burden she is carrying. She "was hailed cheerfully by some, lacrymosely by others, openly pitied by a child of fourteen" (p. 33). Only the hero treats her with sincerity as a human being, and this is the basis of the attraction to him that she feels. This is excellent, but Ursula is too clever a girl to have been deceived by the character of her future brother-in-law. Moreover she must have known him before her blindness and such characters do not develop in a day.

The use of curious and strange devices to help blind persons get about in familiar places is often found in books, to the great amusement of the blind themselves, who realize that it is not by such extraneous aids that they learn to move about, but by means of hearing, touch, facial perception, and all that goes to make up good orientation. Some blind persons acquire excellent orientation and others seem to have little sense of direction. Cannot all of us go about familiar places in the dark? Surely a person permanently in the dark can do the same, and indeed many blind persons through habit and training become exceedingly, sometimes uncannily, skilful in it, and even learn to steer their way successfully in unfamiliar situations. The theme of deceiving a blind person into believing that conditions are other than the facts is also often used, but always with a woeful lack of reality. Mrs. Barclay's popular book, *The Rosary*, is utterly scorned by all the blind persons whom I know for both these reasons. Charles Dickens in *The Cricket on the Hearth* makes one of his few failures in characterization in the person of poor Bertha, who appears to be nothing but a little fool, instead of the sweet girl he wishes to depict. Dickens's example may have influenced others, for we find the same theme, for example, in *The House of Windows* by Isabel Ecclestone Mackay, where the blindness of Ada Brown serves the purpose of making the situation of the two sisters more interesting and pathetic; in *The*

Deliverance by Ellen Glasgow; in *The Flower of the Dusk* by Myrtle Reed, and in many other books.

A pleasing child, considerably idealized but on the whole naturally drawn is found as a minor character in *Shining Ferry*, by A. T. Quiller-Couch. An excellent and helpful thought comes out in a conversation between the boy's grandfather, John Rosewarne, and his aunt, Mrs. Purchase. Looking out of the window at Clem playing with his devoted sister Myra, Rosewarne says:

"I wonder if that boy could be trained and made fit for something." To which Mrs. Purchase replies:

"Eh, is it Clem? My dear man, he is the brains of the family."

"Where's the use of it? What's a blind man at the best?"

"What God meant him to be. If God means him to do better, ay, or to see clearer than other men, 'tisn't a pair of darkened eyes will prevent it." (Pp. 69–70.)

This book also brings out the truth that blind children gain greatly in development by association with seeing children. Many parents of blind children make the mistake of keeping the non-seeing child apart from seeing children, "for fear they will get hurt." Better a few bumps, such as all children get, than an undeveloped mind, poor in the experiences of childhood. Clem is finally sent to an institution for the blind but is so homesick for his sister Myra that he has to be removed. When his Aunt Hannah comes for him she finds him in the dim study hall, unlit as yet, for "the blind need no lamps" (p. 365) which makes for us an unattractive picture of schools for the blind, and untrue to facts, for our schools for the blind are as full of windows and artificially as well lighted as schools for the seeing; for one reason because these schools contain many seeing persons as the faculty, and there are many pupils who are educationally and economically blind, but not totally without sight; besides this, light has its peculiar, beneficient, and recognized effect even upon the totally blind.

Highly idealized, even mystical characters are found in *Deborah*, by James M. Ludlow, and in Hall Caine's *The Scape-*

goat. The books are thrilling with interest but do not conform very closely to the psychology of blindness.

Persons who are both blind and deaf are not often treated by authors, but such an idealized character is found in *God's Fool* by Maarten Maartens, a book full of the pathos of a life wrecked by the fault of others. Little Elias Lossel, adored grandson and heir of a millionaire tea merchant, receives a blow caused by his small half-brother which injures the brain. First hearing, then sight leave him, and gradually the shadows deepen over his brain, so that his intellect never develops beyond that of an eight or nine year-old child. He learns to distinguish letters made upon his hand, and so communication with the world around him is reopened. He recognizes the touch of persons whom he knows,—an observation entirely correct,—and even can sense the presence of those *whom he loves* when they come into the room with him. To sense a presence in the room is not impossible but that the boy should be able to distinguish friend from foe in this way seems rather far-fetched. It is upon this improbable ability that the plot turns. The author has considerable appreciation of the shut-in condition of the double deprivation, and some knowledge of the ways in which help has been attempted. Elias talks laboriously, since he could speak before he became deaf, enjoys walking, loves his plants and pets and potters contentedly about his garden. The story of the afflicted boy and the wrongs done him by those who have the power is a most pathetic one.

William Sterns Davis's stories are always interesting and in his *Falaise of the Blessed Voice* we find a beautiful blind girl, idealized, but not so much so as to be unnatural. Most things that Falaise does are entirely possible for a clever blind girl. "You are blind?" said the Queen. "I see with my ears and my hands," Falaise answered. She knows every stone of the old chateau, even its secret stairways and passageways and can go where she wishes. Her rescue of the wronged queen from the dungeon is dramatic, and for us who know the almost uncanny sense of direction which some blind persons possess, not impossible. She blows out the light to render powerless their enemy,

Alithe, who has come to gloat over the helpless queen, binds and gags her, dresses the queen in Alithe's cloak, and by her sure knowledge of distance and direction guides her lady to safety.

Idealized blind characters are found in many books. We need only mention Muriel, in Mrs. Dinah Maria Muloch Craik's *John Halifax, Gentleman*, and Nydia, in Bulwer Lytton's *Last Days of Pompeii*. It is Nydia's keen sense of direction which enables her to lead others through the darkened streets of the doomed city after the eruption of Vesuvius. The writer has known a similar instance when blind girls led their seeing teachers through the smoke of a burning building to safety. *The Palms* by A. H. Dorsey, and *Melody* by Mrs. Laura E. Richards are other books with idealized blind characters.

In the books mentioned the blind characters have been ideally good, according to the notion of many people that blind persons are naturally good,—or perhaps, have little opportunity to be otherwise. Certain writers, however, have emphasized badness in their blind characters. It is a curious speculation to inquire why this is. Is it because blindness as a physical condition is repugnant to them? Are they lovers of perfection, and do they regard blindness as imperfection? Is the condition symbolic to them of mental darkness? Or, possibly, have they known some unregenerate person without sight and so have translated his misdeeds to the blind characters of their books?

One of the first wicked characters we think of is Pew, Stevenson's villainous blind pirate in *Treasure Island*, with "his voice so cruel and cold and ugly," clever in ability and utterly remorseless in his dealings. Another disagreeable blind character found in Stevenson's works is Duncan McKeigh, in *Kidnapped*. He is a guide who can shoot by the ear at several yards. Charles Dickens, who gave us Bertha, gives us also his horrible conception of Stagg in *Barnaby Rudge*. He is the proprietor of a wretched damp cellar where the Prentice Knights hold their secret meetings. Deceit and intrigue are the food on which he lives. Another evil character is Larsen, the brutal captain of the sailing vessel in Jack London's story, *The Sea Wolf*, who becomes blind during the course of the story, but loses none of his malignity.

Mrs. V. Sackville-West has a strange conception in her book, *The Dragon in Shallow Waters*. The story is set in an atmosphere of horror, accented by the mist and fog of the landscape, and presided over by the malignity of two brothers, one blind and the other deaf from birth. Both are efficient workers in the soap factories, are strong well-built men, and apparently well-educated, for Silas Dene reads braille rapidly, has a passion for books, of which he has read a great many, and torrential gift of words; while Gregory communicates with those around him in rapid finger talk, and is a skilful draughtsman. Silas is bitter over his blindness, resents any reference to it, and hates pity. Some temperaments take this attitude towards their blindness, though personally I believe them to be very few. He is harsh, wantonly cruel, and malignant. As a picture of a blind man he is not convincing, for he writes with paper and pencil, easily, quickly, and legibly, in "able, definite letters." Pencil writing is taught successfully at Perkins Institution, but the best writing is done in square printed letters made by a definite rule on paper laid over a piece of leatherboard with parallel grooved lines. Silas feels his way across a familiar room, yet out of doors apparently hardly needs guidance. Following his hated brother Gregory, he moves confidently, as with perfect vision, climbs a narrow outside stairway to the gallery around the soap vats, and closes in a death grapple with his brother. The author thus sometimes emphasizes the handicap of lack of vision, and sometimes seems to forget that her hero is blind at all. Silas's expression of what blindness means to him is one of the strongest points of the story:

"Did you ever consider what blindness meant? To be dependent on others' charity, to be a burden, a maimed thing! Above all, to have to submit to pity, when you were born with a spirit that wanted the envy of other men!" (P. 258.)

The Night Riders by Ridgewell Cullum is an exciting tale of ranch life in Montana. It centers around the evil character of Julian Marbolt, in whom blindness is used to cloak wickedness. The climax of the story reveals that he is blind only in daylight, but has night vision,—a possibility among diseases of the eye,

and rather ingeniously used. *The Theee Hostages* by John Buchan has a blind woman, the mother of the hero. She does not take a very active part in the story but her presence is felt all the way through it, and her blindness seems to be introduced to emphasize her secret and sinister powers. She is described as a woman with a beautiful face, fine, strong hands, and a lulling voice able to hypnotize her victims into submission. She is called "the blind spinner" indicating that she holds many threads of the plot, like the Norns, and is as inexorable as they.

The extremely clever blind man has been another theme of the novelists. The problem of matching the powers of a keen intellect against the handicap of physical disability of some kind is attractive, and as blindness is one of the greatest handicaps to which a man can be subjected the problem of his ability to surmount his difficulties and achieve success is fascinating. Basil Santoine in *The Blind Man's Eyes* is an exceedingly clever blind lawyer. He might, in fact, be called an impersonated intellect. The character is on the whole well and reasonably drawn, though some of the common inconsistencies in the description of blind persons are found here also. The authors, William McHarg and Edwin Balmer, bring out well and truly that not lack of physical sight but dependence is the real tragedy of blindness. It is one of the tragedies of the hero's life that he is always held back by his blindness and must submit to guidance, and the fact that his intellect is superior to that of most men makes it all the more galling to him that many matters must be trusted to others who may betray his confidence. In fact, he trusts no one fully but his daughter, who is his "eyes." His blindness always obtrudes upon his consciousness and he feels deeply his frequent helplessness. *At 1:30* by Isabel Ostrander is a story of a crime unraveled by a blind detective. The author tries to give her story a plausible air by permitting her hero always to give an explanation by the way he gains his marvelous results,—not by any miracle, but by better use of the faculties remaining to him than most men make. The interesting part of the story to the student of blindness is that however unlikely it may be that one person should combine all these

remarkable qualities, yet none of them is impossible under the urge of a keen brain. *Thornley Colton, Blind Detective,* by Clinton H. Stagg, however, runs wild with this idea of cleverness on the part of a blind man and does not keep within the realm of probability. Thornley Colton is a remarkable man and surely a marvel as a blind man. He seems to be a reaction from the common idea of people that if a person without sight can do anything at all except sit in a sunny corner, he is "wonderful." This is a feeling on the part of seeing persons that has done the unseeing much harm.

Some writers when depicting a blind character have taken him seriously and have made a study of the handicap of blindness. The results are true to life, in proportion to the author's opportunity for study and his realization of the condition. Somewhat in a class by itself is Wilkie Collins's *Poor Miss Finch.* The author wished to portray the effect of restoration to vision upon a person blind from birth or early infancy and therefore made a special study of Diderot's *Lettre sur Les Aveugles,* then the most interesting literature on the subject. He follows Diderot in his correct and his erroneous ideas, bringing in the sayings of "the blind man of Puisaux" and after the operation on Lucilla's eyes, also the stories of the youth who was operated on for cataract by the famous surgeon of Diderot's time, Cheselden. Just as with him, Lucilla must learn to walk again, she cannot judge distance or size, or distinguish one object from another by its mere looks. She mistakes the cat for the dog, until she can put her hands upon them. Wilkie Collins's interest in the problem of blindness is evident for he has another story, *The Dead Secret,* with a blind man normally developed who has recently become blind and is not altogether used to his condition. An author who had peculiar opportunities for studying blind persons was Marion Crawford, the nephew of Julia Ward Howe. He was a frequent visitor at the home of his aunt at or near the Perkins Institution, and his characterization of the blind girl Inez in the story, *In the Palace of the King,* shows first hand knowledge. Many other books have minor blind characters, more or less true to life. *An Egyptian Princess* by

Georg Ebers has the character of Kassandane, the blind queen mother. The interest here is chiefly in the knowledge of diseases of the eye possessed by the Egyptians, supported by the author in copious foot-notes. The book also has an old blind man seated under a plane tree near the gates of Sardis singing sad ditties to the listening crowd and accompanying himself on the twenty-stringed Lydian lute. He does not enter the story otherwise but he is typical of the usual condition of the blind in ancient times and the attitude of the public towards them,—an attitude which persists to some degree even to this day. Charles D. Stewart in *Valley Waters* draws an impressive picture apparently from life, of Vose, a natural and normal man. In *Far in the Forest*, H. Weir Mitchell with the observation of a man of science draws from life, as he tells us, the character of Philetus Richmond who had lost his sight at the age of fifty but could still swing an axe with the best of the woodsmen. He is willing to accept pity from boys and women but never from men unless they can beat him at his own game of tree-felling. H. G. Wells's short story, *The Country of the Blind*, embodies the strange fancy of a land where all the inhabitants are blind, and the one seeing man who strays in is at a disadvantage in relation to those whose lives are ordered on the basis of four senses. It has been remarked that the greatest difficulties of the blind arise from the fact that the world as constituted was made "by the seeing for the seeing." This story tries to reverse this order and construct a world on the basis of four senses.

Miss Edith Ballinger Price made a special study of little blind children in the Boston Nursery for Blind Babies and the Perkins Kindergarten for the blind and as a result of her study has written two books containing charming blind children, the little boy, Kirk, in *The Happy Venture*, and the little girl, Lee Kelton, in *My Lady Lee*. In the latter story, Lee Kelton is adopted by a young woman, Anne Ramsey, who becomes the real heroine of the story. Anne's intention is to bring the child up naturally in the loving atmosphere of a wise home, without over-indulgence and without fore-ordination towards a special workshop for the blind; rather to allow her to develop her own

talents as other children do, and to make of her "a different sort of blind person." Miss Burke, head of the Nursery from which Anne takes the child, warns her wisely of the difficulties ahead; "I have no fear that you'll spoil her but you'll have a hard time saving her from your friends." And so it proves, for, as Anne finds, the public exhibits three wrong attitudes towards a blind child,—pity, wonder, and incredulity, and all three are deadening to self-respect, initiative and confidence in the blind person. As a child, Lee is charming and true to life. When circumstances force Anne to put her in a school for the blind, we have a rather unfortunate and unfair picture of such schools, which it should be said are now-a-days places of joy and opportunity for little children deprived of their rightful heritage of sight. That there are schools not at all like the one she describes, Miss Price is willing to admit. Lee, grown up and out in the world is not very interesting, in fact she may be called a rather tiresome young person, and the episode of her being able to deceive for a considerable time as to her blindness a young man who is attracted to her seems impossible. A clever criticism of the book has been written in a letter to a friend by a blind woman. I make a short quotation:

> Miss Price is a much more clever writer than I could ever be, and since she took the girl out from a class of people of whom I know but very little except from books, I feel that I am in no position to criticise. . . . . To me, the really likable and interesting personality, in spite of her many mistakes, is Anne, not Lee. . . . . To my way of thinking, two things are fundamentally wrong with the book. The emphasis is too often placed on trifles, while important things are left out. In the second place, why ring the changes upon blindness all the time, and make everything hang upon that fact, when you and I know what very likely Miss Price does not, that there is much in life, every day we live it, that has little or no bearing upon being blind. . . . . One reason why I could never write a successful story about a blind girl is that there would be so much in her life and her mind, that being blind, inescapable calamity though it is, could not possibly be the central fact to be harped upon every minute,—it simply is not big enough to make the entire background of a story.

The indomitable spirit of many of our blind friends pervades this quotation. Self-pity and a desire for special consideration

are far from the thoughts of such persons as the writer of the above paragraph. Miss Price has nevertheless done a good piece of work from first-hand knowledge of blind children, has presented the complex problem of their training, and in this way has put teachers in her debt.

Another phase of the interest in persons who do not see concerns the problems of the newly blinded and their readjustment to life. *The Glory of the Conquered* was written by Susan Glaspell. It is the story of the tragedy of blindness coming upon a man in the full tide of his career of usefulness. The struggle to hold and keep faith and courage, to change "Vae Victis" to "Gloria Victis" is well, though somewhat sentimentally treated. It is a rather easy solution of the problem to make her hero die at the end of the book, but probably the author did not know what else to do with him. The attempt to deceive a blind person is used again in this book, and is an unattractive part of the story. In *The Keeper of the Door* by Ethel Dell is found Noel, the brother of the hero. He is blinded suddenly by a bomb, and the story contains a good description of the feelings of one who becomes suddenly blind. *The Best of a Bad Job* by Norman Duncan has Tom Tulk, snow-blinded off the Newfoundland coast. He discovers the use of echoes in guiding a ship.

A recent development of the interest in blind people has been caused by the war. A story most compelling in its appeal is by a French author, René Boylesve, translated by Louise Seymour Houghton, you *No Longer Count*, representing the spirit of France, whose people rose to the pitch of feeling that the individual no longer mattered, since France was in danger. The blinded soldiers who have given their precious gift of sight to their country are a special interest and responsibility. *The Bells of St. Johns* by Mrs. Richmond contains Miles, the hero, blinded in the war, and on his return driven nearly to distraction by the unremitting attentions of his family. Frederick Palmer's hero, Phillip Sanford, in *The Old Blood*, becomes temporarily both blind and deaf from the shock of a bursting shell which horribly wounded his face. Fortunately a series of

operations restores the wounded jaw, his eyes and ears gradually recover, and happiness comes to all.

In drama and poetry, we also find some blind characters. The first one who comes to mind is Samson, in Milton's *Samson Agonistes*. The hero blinded and in the hands of his enemies, but rising triumphant over them and doing one more deed for Israel, is a figure of Milton himself old and blinded in his country's service. Longfellow's translation from the Gascon, *The Blind Girl of Castèl Cuillè, King René's Daughter* by Henrik Hertz, and Schiller's *Wilhelm Tell* all contain blind characters. Maeterlinck has a symbolic drama, *The Blind*, in which all the characters are blind, symbolic of a world lost in unfaith.

The books mentioned while by no means exhausting the number written with the interest of blindness illustrate fairly well the attitude of writers and of the public towards those who do not see,—mostly, as the illustrations show, an idealizing attitude, sometimes one of wonder and exaggeration, sometimes one of repugnance. Occasionally the sane and normal attitude is shown, which regards the person without sight as a human being with a handicap which must either render him over twenty per cent less efficient, or must call forth all his powers of will and energy to overcome it. But what the world does not realize is that there have been many useful, many even famous, persons who do not see, both men and women, who have so mounted over their handicap as to make it a stepping stone instead of a stumbling block. Their lives are more fascinating and romantic than any fiction written about blind people; for these tales are true. They are the high lights among those who do not see, just as such persons are among the seeing. Henry Fawcett, postmaster general of England; Sir Francis Campbell, an American, knighted for his services in the education of the blind in England; Clarence Hawkes, nature writer, whose books are in many schools, and whose *Hitting the Dark Trail* should be read by every one as a piece of inspirational literature; Dr. Babcock, specialist in the diseases of the heart; Fanny Crosby, hymn writer, who said "The blind can accomplish nearly every thing the seeing can do;" Helen Keller, writer,

the blind and deaf woman whom every one honors; Sir Arthur Pearson, founder of St. Dunstan's, the great school for the rehabilitation of blinded soldiers in London, who when he realized that his sight was leaving him, said, "I shall soon be blind, but I will never be a blind man,—I am going to be *the* blind man." He proceeded to put his resolution in force, even dispensing with the services of his valet, in order that he might learn to become more skilful in caring for himself. He says: "The first step is to acquire the will to overcome blindness in every possible way, and to approach as nearly as may be to a perfectly normal life. And this cannot be done without determination to leave depression behind, and to adopt a cheerful mental outlook. This outlook is easy to talk about, but difficult to practice."

These men and women and many others like them know whereof they speak. They are the last to claim for themselves extraordinary or miraculous powers and a compensatory quickening of the other senses. They succeeded by sheer force of will, pluck, determination, and the ability to make better use of their remaining senses than do most people. Their success did not come because of their blindness, but in spite of it. They are the real *Heroes of Darkness*, and to a study of their achievements all persons interested in the problems of blindness are commended.

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MENTAL DEVELOPMENT IN THE CHILDREN OF DELINQUENT GIRLS

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Relatively little investigation has been conducted among the infants and small children of delinquent mothers for the purpose of securing rates or norms concerning their mental growth. Such studies are quite necessary in order to either confirm or correct the many existing theories in respect to this group. Obviously, this type of material is both difficult to secure and to follow over a long period of time, although such a method of procedure is the only one which will yield suitable results.

Between the years 1920 and 1928 about forty infants were studied at the Institution for Feebleminded, Columbus, Ohio. Some of these babies were born in the Institution, others were brought in with their young mothers. The mothers were committed to I. F. M. because of their inability to make a satisfactory social adjustment outside and in most cases were classified as defective delinquents. Each was given a Stanford-Binet test at the time of admission. The fathers of these children could not be studied as carefully as the mothers, however, it was possible to secure valuable information concerning many of them, in some cases through a direct interview.

Of the forty children studied, only twenty-five are here reported, the other fifteen being eliminated simply because the period of observation was too short. The cases presented have all been under appropriate study for an extended period of time and have been given at least three successive tests to determine the mental development. The original plan contemplated a study which would continue through the adolescent period of each child but there was difficulty in adhering to such an arrangement, primarily because of a lack of active coöperation.

Gesell's (1) outline of normal child development was not available at the time this work was started and consequently was not used on any of the cases. If his system had been adopted it would have added to the value of this treatise.

A brief genealogy is shown in table 1. This presents only a part of the facts since an adequate social history is lacking in the majority of cases. It is definitely known that in eleven cases, grandparents of these children are either feebleminded or insane. One father is known to be of average intelligence. Eight are known to be below average and of these, two are very definitely feebleminded. It is said that three other fathers are

TABLE 1

Brief genealogical table of the twenty-five children

	NUMBER OF CASES
Subject is a legitimate child	5
Subject is an illegitimate child	20
More than one illegitimate child to same mother	7
Known defective siblings of child	5
Known defective siblings of mother	9
Known defective fathers	8
Known defective maternal grandparents	11

below average but the sources of these statements are not authoritative. As would be supposed, the majority of the children are illegitimate, seven of the mothers having more than one child so designated. Two of the children presented in this study are blood relatives, the others show no genetic relation. Three of the children were born illegitimately to married mothers. In one such case the husband was in the army; in another, in a penitentiary; the third had deserted the family.

With these facts in mind let us now consider the children themselves. The birth of each child, so far as could be ascertained, was normal. Minor variations were evident during pregnancy, birth and early infancy but in no instance were these sufficient to be of any appreciable consequence in their

TABLE 2

Complete table showing C.A., M.A., and IQ, for all tests of the 25 children

CASE	SEX	FIRST TEST			SECOND TEST			THIRD TEST			FOURTH TEST			FIFTH TEST			SIXTH TEST		
		C.A.	M.A.	IQ	C.A.	M.A.	IQ	C.A.	M.A.	IQ	C.A.	M.A.	IQ	C.A.	M.A.	IQ	C.A.	M.A.	IQ
1	♀	1.6	1.0	64	4.2	3.8	92	4.8	4.3	89	5.7	4.7	82	7.5	6.0	80			
2	♂	1.0	0.7	68	5.1	3.7	72	5.8	4.5	78	6.6	4.8	73	8.5	7.0	83			
3	♀	1.9	1.3	69	5.4	4.7	85	6.0	4.7	77	6.7	6.0	90	7.8	8.3	106			
4	♂	2.6	1.8	71	4.3	3.7	86	6.0	4.5	75	7.3	5.7	77	9.7	8.8	91*			
5	♂	4.2	3.0	72	4.8	3.7	75	5.7	4.2	72	6.3	5.2	83*	6.6	5.5	84*			
6	♀	2.3	1.6	74	5.7	5.0	88	6.3	5.2	82	7.0	6.2	88	7.8	7.0	89			
7	♂	2.1	1.7	80	3.8	3.2	84	5.5	4.0	72	6.8	5.3	78	8.5	6.8	80*			
8	♀	3.8	3.0	80	5.8	5.3	91	6.7	6.0	90	7.1	6.7	94	7.8	7.7	97	8.5	9.0	106*
9	♂	2.5	2.1	83	4.0	3.4	85	6.0	5.0	83	7.3	5.8	79	9.5	8.2	84*			
10	♀	2.3	0.8	37	7.0	2.3	32	7.8	2.5	31	9.7	3.7	38						
11	♀	2.3	0.9	39	5.8	2.3	40	6.7	3.0	45	8.6	4.3	51						
12	♀	5.8	3.5	60	6.3	4.0	63	7.0	5.5	78	7.5	6.2	84						
13	♂	2.2	1.4	65	3.6	3.5	96	4.3	3.8	88	6.7	6.7	100*						
14	♀	1.7	1.3	70	2.3	2.0	85	3.8	2.7	70	4.8	2.8	59*						
15	♂	4.4	3.2	71	5.1	3.3	65	5.9	3.5	60	6.5	3.7	56						
16	♀	0.8	0.6	78	4.9	4.5	91	5.5	5.3	96	6.3	5.8	93						
17	♀	4.2	3.7	88	4.8	4.3	89	5.7	5.0	87	7.5	7.0	93						
18	♂	1.4	0.7	50	2.0	1.5	70	2.8	2.3	82									
19	♀	1.7	0.8	50	2.3	1.7	74	3.1	2.5	80									
20	♂	2.4	1.3	52	3.1	2.5	81	4.4	4.0	90*									
21	♂	0.8	0.6	70	4.9	3.3	67	5.5	4.3	78									
22	♀	2.8	2.0	72	3.4	2.3	68	4.9	2.5	51*									
23	♂	4.7	3.8	82	5.3	5.7	106	6.6	6.6	100*									
24	♂	2.5	2.3	90	3.2	2.8	89	4.6	4.9	107									
25	♀	4.6	4.5	98	5.2	5.2	100	6.0	5.8	97									

* Test made after discharge.

relation to the physical or mental growth of the child. Each baby was given the advantages of close medical attention, proper diet and the best available surroundings while in the Institution. In all cases the physical development ranged within what might be termed normal limits.

The intellectual development was watched with keen interest. Two mental test scales were used throughout, the Kuhlmann for infants, the Standford-Binet beyond the three-year level. In so far as it was possible, mental tests were made about once a year although in several instances the interval was two, three or four years. In all, 102 such tests were given these children,

TABLE

Indicating the average C.A. and IQ of all children receiving a minimum of five, four, and three tests, respectively

TEST	9 CHILDREN TESTED AT LEAST 5 TIMES		17 CHILDREN TESTED AT LEAST 4 TIMES		25 CHILDREN TESTED AT LEAST 3 TIMES	
	C.A.	IQ	C.A.	IQ	C.A.	IQ
First	2.4	73	2.7	69	2.7	69
Second	4.8	84	4.9	77	4.5	79
Third	5.9	80	5.8	75	5.5	78
Fourth	6.7	83	6.9	77		
Fifth	8.2	88				

varying from 3 to 6 tests per child with an average of approximately 4. In order to present a clearer understanding of the development in each case a complete analysis of the material collected is presented in table 2. It will be seen that cases 1 to 9 were given at least five mental tests, cases 1 to 17 were given at least four tests and all 25 cases were given at least three tests. These three groups are shown in table 3 with the average life age (C.A.) and average intelligence quotient for each consecutive series. It is evident in all three groups that there is an actual tendency for the IQ to increase. There is undoubtedly considerable significance connected with this fact but one hesitates to ruminate too freely on the subject.

Table 4 shows the exact amount of IQ variation in succeeding tests with the C.A. time interval indicated in each instance.

TABLE 4

Changes in C.A. and IQ in consecutive tests

CASE NUMBER	BETWEEN FIRST AND SECOND		BETWEEN SECOND AND THIRD		BETWEEN THIRD AND FOURTH		BETWEEN FOURTH AND FIFTH		BETWEEN FIFTH AND SIXTH	
	C.A. interval	IQ change	C.A. interval	IQ change	C.A. interval	IQ change	C.A. interval	IQ change	C.A. interval	IQ change
1	2.6	+28	0.6	−3	0.9	−7	1.8	−2		
2	4.1	+4	0.7	+6	0.8	−5	1.9	+10		
3	3.5	+16	0.6	−8	0.7	+13	1.2	+16		
4	1.7	+15	1.7	−11	1.3	+2	2.4	+14		
5	0.6	+3	0.7	−3	0.6	+11	0.3	+1		
6	2.4	+14	0.7	−6	0.6	+6	0.8	+1		
7	1.7	+4	1.7	−12	1.3	+6	1.7	+2		
8	2.0	+11	0.9	−1	0.4	+4	0.7	+3	0.7	+9
9	1.5	+2	2.0	−2	1.3	+4	2.2	+5		
10	4.7	−5	0.8	−1	1.9	+7				
11	3.5	+1	0.9	+5	1.9	+6				
12	0.5	+3	0.7	+15	0.5	+6				
13	1.4	+31	0.7	−8	2.4	+12				
14	0.6	+15	1.5	−15	1.0	−11				
15	0.7	−6	0.8	−5	0.6	−4				
16	4.1	+13	0.6	+5	0.9	−3				
17	0.6	+1	0.9	−2	1.8	+6				
18	0.6	+20	0.8	+12						
19	0.6	+24	0.8	+6						
20	0.7	+29	0.6	+9						
21	4.1	−3	0.6	+11						
22	0.6	−4	1.5	−17						
23	0.6	+24	1.3	−6						
24	0.7	−1	1.4	+18						
25	0.6	+2	0.8	−3						

For example, in case 1 there is a lapse of 2.6 years between the first and second tests, during which this girl makes a gain of 28 points in her IQ. A study of this table shows that in 6 cases

(24 per cent) the IQ remains relatively constant, that is, does not vary more than 10 points. In 19 cases (76 per cent) the IQ is definitely inconstant, varying more than 10 points. Of these 19 cases with inconstant IQ's, 15 (60 per cent) tend to rise while 4 (16 per cent) fall. It is of interest to note that in the four cases with declining quotients the mothers are all imbeciles.

The average IQ of first tests for all children is 69, of last tests for all children, 82.4; the average of all tests of all children is 77. The average IQ for all the mothers at the time of admission is 54.5, (calculated on a basis of 16 years for adults). This indicates briefly, although perhaps in a crude way, the general improvement of the children as a group and the relative advan-

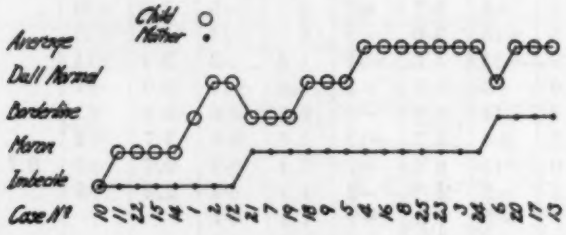

FIG. 1. INTELLIGENCE LEVEL OF MOTHER COMPARED WITH CHILD (LAST TEST)

tage obtained over their mothers. The psychometric examination of each mother shows that four of them are estimated as having borderline intelligence; thirteen are rated as morons; eight are classified as imbeciles. On the average the mothers stand at the low moron level while the children at the time last tested had reached an average which gave them a dull normal rating.

In figure 1 an attempt is made to indicate the degree of correlation that exists between the intelligence levels of the mothers and children, (last test). It is evident that these children, ranging in age from 3 to 9 years (average 6.8 years), excel their mothers in 24 cases out of 25. This superiority is quite convincing in 23 cases amounting to an IQ advantage of more than 10

points.[1] It should be borne in mind that the IQ's of the children are based on the lower ranges of the scale while the IQ's of the mothers are based on the upper. This discrepancy might have some influence on the results although it would probably be of minor importance. In a similar study Atkinson (2) found that, of twenty-four infants, 10 excelled while 12 equalled the efforts of their respective mothers. The three mothers whose intelligence ratings indicate a borderline level produced four children (100 per cent) whose ratings are dull normal or better. The thirteen moron mothers have seven children (54 per cent) who measure average, three children (23 per cent) who are dull normal and three children (23 per cent) who are of borderline intelligence. The eight imbecile mothers have children who range as follows: two (25 per cent) are dull normal; one (12 per cent) borderline; four (50 per cent) morons; one (12 per cent) imbecile.

It is clearly seen that the intelligence of the child tends to be directly influenced by the mental capacities of the mother, however, in all cases but one the children actually excel. It is possible that as adults the mentality of these children may approach the general level of their mothers, still, that does not fully explain the present ascendency. From what is known concerning the nine fathers, it is doubtful if their average intelligence would surpass the high grade moron. Three other fathers are said to be below average so that at least half of these men present a relatively lower mental level than their young children.

If the question of environment is discussed in connection with this problem, it must be remembered that the formative years were passed in an institution for feebleminded and that in the majority of cases the first years of academic effort were spent in the institution school. Ten of the children are now outside the influence of the Institution for Feebleminded (table 2), three having been out more than two years. Of these ten children, three have sustained a relative decline in intelligence

[1] To mention the cases not reported in this paper—9 of the children surpass their mothers in IQ while in only one case does the mother excel.

as indicated by the IQ. The other seven have shown an increase although one of these is only by two points.

It would be most interesting to follow these children through the next ten years, in fact, the period of greatest interest has not yet been reached. What their intelligence will be in adult life can only be conjectured but one may presume that they will make relatively less progress in the future than in the past.

SUMMARY

It is with considerable hesitation that one attempts to arrive at very definite conclusions in regard to these cases. The group is, after all, rather small; furthermore, the age difference between parents and offsprings must be kept in mind throughout. A careful consideration of the data presented will permit one to drawn the following inferences:

1. All of these children are apparently of average physical development.

2. Of the twenty-five children only ten are of average intelligence, showing a tendency on the part of the majority (60 per cent) toward a degree of mental deficiency.

3. None of the twenty-five surpass the average in mental ability; on the other hand, none fall to the idiot level.

4. In the aggregate, there is a propensity toward improvement of mentality as adolescence is approached.

5. In all cases save one, the children are of a relatively higher mentality than their mothers as judged by psychometric tests (through the computed IQ).

6. The influence of environment is questionable. Of seven children whose IQ improved more than twenty points, during the study, four were still in the Institution while three had been placed in homes outside.

7. These results support the theory that mental deficiency is a recessive character, the tendency being rather toward the normal state. This coincides with similar results and statements made by other workers in this and allied fields, namely, that the general trend of inheritance seems to be toward the average.

After all, it is essential that such children be considered individually and not as a group. Although one may class them as potentially hypophrenic it does not follow that certain ones may not be able to successfully fit themselves into the modern social scheme.

Such studies as this are of relative importance. Further investigation and more subjects are essential before valid generalizations can be made. It is to be hoped that as this problem is studied the educational and training side will receive due consideration. Undoubtedly it is true that the early guidance of many of these selected cases largely determines what social adjustment they will be able to make in later life.

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A TABLE FOR FINDING THE PROBABLE ERROR OF R OBTAINED BY USE OF THE SPEARMAN-BROWN FORMULA ($n = 2$)

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In using the Spearman-Brown prophesy formula, a knowledge of the probable error of the function may be of value. In practically none of the studies where this formula has been used, has any notion of its probable error been suggested. The Spearman-Brown prophesy formula is as follows:

$$R = \frac{nr}{1 + (n - 1)\, r} \tag{1}$$

Shen[1] has derived the standard error of the function R.

$$\sigma_R = \frac{n\,(1 - r^2)}{\sqrt{N\,[1 + (n - 1)\, r]^3}} \tag{2}$$

In both formulas (1) and (2), r is the average intercorrelation of the n multiples of the test used, n is the number of repetitions or multiples of the test, and N is the number of cases.

The most frequent case is that n is 2. In this case, formula (1) becomes

$$R = \frac{2\,r}{1 + r} \tag{3}$$

and the Probable Error of R, when $n = 2$ is

$$\mathrm{PE}_R = \frac{1.34898\,(1 - r^2)}{\sqrt{N}\,(1 + r)^2} \tag{4}$$

[1] Shen, Eugene: The Standard Error of Certain Estimated Coefficients of Correlation. Journal of Educational Psychology, 1924, 15: 482–465.

In the following table, the values of PE_R are given for values of r of 0.01 to 0.99 and values of N from 20 to 300.

DIRECTION FOR USING THE TABLE TO FIND PE_R

The table may be entered with N and either r or R.

1. Find the column showing the number of cases (N) on which the "odds-evens" correlation r is based.
2. Follow down this column until the row r (see left margin) or R (right margin) is reached. The table entry at this place is PE_R given to three decimals. The decimal has been omitted from the table entries.

For example:

$$r = .36; N = 70$$

1. Find the column $N = 70$.
2. Follow down this column until the row $r = .36$, ($R = .529$) is reached. (r is given at the extreme left end of the row and R is given at the right end of the row.) The value of PE_R is found to be .076.

The table can also be used to find R when r is given, since r is the entry at the left end of the row and the corresponding R at the right end of the row.

r	PROBABLE ERRORS OF VALUES OF R INVOLVING THE FOLLOWING NUMBERS OF CASES																				R
	20	25	30	35	40	45	50	60	70	80	90	100	125	150	175	200	225	250	275	300	
.01	296	264	241	224	209	197	187	171	158	148	139	132	118	108	100	093	088	084	080	076	.020
.02	290	259	237	219	205	193	183	167	155	145	137	130	116	106	098	092	086	082	078	075	.039
.03	284	254	231	215	201	189	180	164	152	142	134	127	114	104	096	090	085	080	077	073	.058
.04	278	249	227	210	197	186	176	161	149	139	131	125	111	102	094	088	083	079	075	072	.077
.05	273	244	223	206	193	182	173	158	146	136	129	122	109	100	092	086	081	077	074	070	.095
.06	268	239	218	202	189	178	169	154	143	134	126	120	107	098	090	085	080	076	072	069	.113
.07	262	234	214	198	185	175	166	151	140	131	124	117	105	096	089	083	078	074	071	068	.131
.08	257	230	210	194	182	171	163	148	137	128	121	115	103	094	087	081	077	073	069	066	.148
.09	252	225	206	190	178	168	159	145	135	126	119	113	101	092	085	080	075	071	068	065	.165
.10	247	221	202	187	175	165	156	142	132	123	116	110	099	090	083	078	074	070	067	064	.182
.11	242	216	197	183	171	161	153	140	129	121	114	108	097	088	082	076	072	068	065	062	.198
.12	237	212	194	179	168	158	150	137	127	118	112	106	095	087	080	075	071	067	064	061	.214
.13	232	208	190	176	164	155	147	134	124	116	109	104	093	085	079	073	069	066	063	060	.230
.14	228	204	186	172	161	152	144	131	122	114	107	102	091	083	077	072	068	064	061	059	.246
.15	223	199	182	169	158	149	141	129	119	111	105	100	089	081	075	071	066	063	060	058	.261
.16	218	195	178	165	154	146	138	126	117	109	103	098	087	080	074	069	065	062	059	056	.276
.17	214	191	175	162	151	143	135	124	114	107	101	096	086	078	072	068	064	061	058	055	.291
.18	210	187	171	158	148	140	133	121	112	105	099	094	084	077	071	066	062	059	057	054	.305
.19	205	184	168	155	145	137	130	119	110	103	097	092	082	075	069	065	061	058	055	053	.319
.20	201	180	164	152	142	134	127	116	107	101	095	090	080	073	068	064	060	057	054	052	.333

.21	197	176	161	149	139	131	125	114	105	098	093	088	079	072	067	062	059	056	053	051	.347
.22	193	172	157	146	136	129	122	111	103	096	091	086	077	070	065	061	057	055	052	050	.361
.23	189	169	154	143	134	126	119	109	101	094	089	084	076	069	064	060	056	053	051	049	.374
.24	185	165	151	140	131	123	117	107	099	092	087	083	074	068	062	058	055	052	050	048	.387
.25	181	162	148	137	128	121	114	104	097	090	085	081	072	066	061	057	054	051	049	047	.400
.26	177	158	145	134	125	118	112	102	095	089	084	079	071	065	060	056	053	050	048	046	.413
.27	173	155	142	131	123	116	110	100	093	087	082	078	069	063	059	055	052	049	047	045	.425
.28	170	152	138	128	120	113	107	098	091	085	080	076	068	062	057	054	051	048	046	044	.438
.29	166	148	136	125	117	111	105	096	089	083	078	074	066	061	056	053	049	047	045	043	.450
.30	162	145	133	123	115	108	103	094	087	081	077	073	065	059	055	051	048	046	044	042	.462
.31	159	142	130	120	112	106	100	092	085	079	075	071	064	058	054	050	047	045	043	041	.473
.32	155	139	127	117	110	104	098	090	083	078	073	069	062	057	053	049	046	044	042	040	.485
.33	152	136	124	115	107	101	096	088	081	076	072	068	061	055	051	048	045	043	041	039	.496
.34	149	133	121	112	105	099	094	086	079	074	070	066	059	054	050	047	044	042	040	038	.507
.35	145	130	119	110	103	097	092	084	078	073	068	065	058	053	049	046	043	041	039	038	.519
.36	142	127	116	107	100	095	090	082	076	071	067	063	057	052	048	045	042	040	038	037	.529
.37	139	124	113	105	098	092	088	080	074	069	065	062	055	051	047	044	041	039	037	036	.540
.38	136	121	110	102	096	090	086	078	072	068	064	061	054	049	046	043	040	038	037	035	.551
.39	132	118	108	100	094	088	084	076	071	066	062	059	053	048	045	042	039	037	036	034	.561
.40	129	116	106	098	091	086	082	075	069	065	061	058	052	047	044	041	039	037	035	033	.571
.41	126	113	103	095	089	084	080	073	067	063	060	056	050	046	043	040	038	036	034	033	.582
.42	123	110	101	093	087	082	078	071	066	062	058	055	049	045	042	039	037	035	033	032	.592
.43	120	108	098	091	085	080	076	069	064	060	057	054	048	044	041	038	036	034	032	031	.601

r	PROBABLE ERRORS OF VALUES OF R INVOLVING THE FOLLOWING NUMBERS OF CASES																				R
	20	25	30	35	40	45	50	60	70	80	90	100	125	150	175	200	225	250	275	300	
.44	117	105	096	089	083	078	074	068	063	059	055	052	047	043	040	037	035	033	032	030	.611
.45	114	102	093	086	081	076	072	066	061	057	054	051	046	042	039	036	034	032	031	030	.621
.46	112	100	091	084	079	074	071	064	060	056	053	050	045	041	038	035	033	032	030	029	.630
.47	109	097	089	082	077	073	069	063	058	054	051	049	044	040	037	034	032	031	029	028	.639
.48	106	095	087	080	075	071	067	061	057	053	050	047	042	039	036	034	032	030	029	027	.649
.49	103	092	084	078	073	069	065	060	055	052	049	046	041	038	035	033	031	029	028	027	.658
.50	101	090	082	076	071	067	064	058	054	050	047	045	040	037	034	032	030	028	027	026	.667
.51	098	088	080	074	069	065	062	057	052	049	046	044	039	036	033	031	029	028	026	025	.675
.52	095	085	078	072	067	064	060	055	051	048	045	043	038	035	032	030	028	027	026	025	.684
.53	093	083	076	070	066	062	059	053	050	046	044	041	037	034	031	029	028	026	025	024	.693
.54	090	081	074	068	064	060	057	052	048	045	042	040	036	033	030	028	027	025	024	023	.701
.55	088	078	071	066	062	058	055	051	047	044	041	039	035	032	030	028	026	025	024	023	.710
.56	085	076	069	064	060	057	054	049	045	043	040	038	034	031	029	027	025	024	023	022	.718
.57	083	074	067	062	058	055	052	048	044	041	039	037	033	030	028	026	025	023	022	021	.726
.58	080	072	065	061	057	053	051	046	043	040	038	036	032	029	027	025	024	023	021	021	.734
.59	078	070	063	059	055	052	049	045	042	039	037	035	031	028	026	025	023	022	021	020	.742
.60	075	067	062	057	053	050	048	044	040	038	036	034	030	028	025	024	022	021	020	019	.750
.61	073	065	060	055	052	049	046	042	039	037	034	033	029	027	025	023	022	021	020	019	.758
.62	071	063	058	053	050	047	045	041	038	035	033	032	029	026	024	022	021	020	019	018	.765

.63	068	061	056	052	048	046	043	040	037	034	032	031	027	025	023	022	020	019	018	018	.773
.64	066	059	054	050	047	044	042	038	035	033	031	030	026	024	022	021	020	019	018	017	.780
.65	064	057	052	048	045	043	040	037	034	032	030	029	026	023	022	020	019	018	017	017	.788
.66	062	055	050	047	044	041	039	036	033	031	029	029	025	023	021	019	018	017	017	016	.795
.67	060	053	049	045	042	040	038	034	032	030	028	027	024	022	020	019	018	017	016	015	.802
.68	057	051	047	043	041	038	036	033	031	029	027	026	023	021	019	018	017	016	015	015	.810
.69	055	049	045	042	039	037	035	032	030	028	026	025	022	020	019	017	016	016	015	014	.817
.70	053	048	043	040	038	035	034	031	028	027	025	024	021	019	018	017	016	015	014	014	.824
.71	051	046	042	039	036	034	032	030	027	026	024	023	020	019	017	016	015	014	014	013	.830
.72	049	044	040	037	035	033	031	028	026	025	023	022	020	018	017	016	015	014	013	013	.837
.73	047	042	038	036	033	031	030	027	025	024	022	021	019	017	016	015	014	013	013	012	.844
.74	045	040	037	034	032	030	029	026	024	022	021	020	018	016	015	014	013	013	012	012	.851
.75	043	039	035	033	030	029	027	025	023	021	020	019	017	016	015	014	013	012	012	011	.857
.76	041	037	034	031	029	027	026	024	022	021	019	018	016	015	014	013	012	012	011	011	.864
.77	039	035	032	030	028	026	025	023	021	020	018	018	016	014	013	012	012	011	011	010	.870
.78	037	033	030	028	026	025	024	022	020	019	018	017	015	014	013	012	011	011	010	010	.876
.79	035	032	029	027	025	024	022	020	019	018	017	016	014	013	012	011	011	010	010	009	.883
.80	034	030	027	025	024	022	021	019	018	017	016	015	013	012	011	011	010	009	009	009	.889
.81	032	028	026	024	022	021	020	018	017	016	015	014	013	012	011	010	009	009	009	008	.895
.82	030	027	024	023	021	020	019	017	016	015	014	013	012	011	010	009	009	008	008	008	.901
.83	028	025	023	021	020	019	018	016	015	014	013	013	011	010	009	009	008	008	008	007	.907
.84	026	023	021	020	019	018	017	015	014	013	012	012	010	010	009	008	008	007	007	007	.913
.85	024	022	020	018	017	016	015	014	013	012	012	011	010	009	008	008	007	007	007	006	.919

r	PROBABLE ERRORS OF VALUES OF R INVOLVING THE FOLLOWING NUMBERS OF CASES																				R
	20	25	30	35	40	45	50	60	70	80	90	100	125	150	175	200	225	250	275	300	
.86	023	020	019	017	016	015	014	013	012	011	011	010	009	008	008	007	007	006	006	006	.925
.87	021	019	017	016	015	014	013	012	011	010	010	009	008	008	007	007	006	006	006	005	.930
.88	019	017	016	015	014	013	012	011	010	010	009	009	008	007	007	006	006	005	005	005	.936
.89	018	016	014	013	012	012	011	010	009	009	008	008	007	006	006	006	005	005	005	005	.942
.90	016	014	013	012	011	011	010	009	008	008	007	007	006	006	005	005	005	004	004	004	.947
.91	014	013	012	011	010	009	009	008	008	007	007	006	006	005	005	004	004	004	004	004	.953
.92	013	011	010	009	009	008	008	007	007	006	006	006	005	005	004	004	004	004	003	003	.958
.93	011	010	009	008	008	007	007	006	006	005	005	005	004	004	004	003	003	003	003	003	.964
.94	009	008	008	007	007	006	006	005	005	005	004	004	004	003	003	003	003	003	003	002	.969
.95	008	007	006	006	005	005	005	004	004	004	004	003	003	003	003	002	002	002	002	002	.974
.96	006	006	005	005	004	004	004	004	003	003	003	003	002	002	002	002	002	002	002	002	.980
.97	005	004	004	003	003	003	003	003	002	002	002	002	002	002	002	001	001	001	001	001	.985
.98	003	003	002	002	002	002	002	002	002	002	001	001	001	001	001	001	001	001	001	001	.990
.99	002	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	.995

NEWS AND NOTES

PROFESSOR PERRIN'S STATEMENT CONCERNING MR. MCNUTT'S EXPLANATION AND APOLOGY

November 15, 1929

PROFESSOR JAMES P. PORTER,
Editor, Journal of Applied Psychology

Dear Sir:

Kindly give me space in the JOURNAL to disclaim responsibility for the fact that Mr. W. S. McNutt, according to his statement in a recent number of the JOURNAL (June, 1929) confused some remarks of mine made during a series of lectures some years ago with passages from Titchener's *Textbook of Psychology* (pp. 364, 367, 368, 369). Inasmuch as the course in Experimental Psychology, to which Mr. McNutt refers, was conducted in the usual way with lectures, assigned readings and experiments, I can conceive of no reason why any student in the course should have failed to distinguish between the assigned material and the lectures. Certainly the latter would not have been memorized verbatim by myself prior to their delivery or at any other time and neither were they read from manuscripts.

Yours very truly,
F. A. C. PERRIN,
University of Texas.

Editor's Note: It is now clear that Mr. McNutt cannot or will not explain as to just how his notes so closely resembled the writings of Professor Titchener.

Dr. G. M. RUCH (California) contributes to the discussion by Drs. Stoddard and Langlie concerning the Factor of Training in the Iowa (Chemistry Aptitude) Placement Examination.

Professors George D. Stoddard and T. A. Langlie have from time to time engaged in discussion of the degree to which the *Iowa Placement Examination, Chemistry Aptitude*, depends upon training.[1] In the second of the references cited below the following statement occurs: "If the aptitude tests do not depend upon training, students who have had no chemistry training should score as high on the average as students

[1] Journal of Applied Psychology, 10, 1926, pp. 303–314. *Ibid*, 13, 1929, pp. 589–591. Psychological Monographs, 39, 1928, No. 2. Journal of Educational Psychology, 19, 1928, pp. 657–665.

who have not studied chemistry in high school" (p. 590). Convincing evidence is given in support of the foregoing statement. Again (p. 591), Langlie says, "The only conclusion that seems possible is that these aptitude tests measure 'training' to some extent."

The writer holds that Langlie's explanation is a possible one. On the other hand there is an alternative explanation, viz., the fact that students who have taken (often, elected) chemistry in high school are likely to be more highly selected than those who have not elected this study, and that such selection is likely to take place to some degree upon a basis of interest in and aptitude for the subject of chemistry. In many similar situations we have proved that election of courses is a selective process quite capable of producing effects even greater than the relatively slight differences reported by Langlie. (The differences were in amounts of roughly 3 to 10 per cent when means were compared.)

FELLOWSHIPS IN PSYCHOLOGY

The Administrative Board of the Wayne County Training School announces the appointment of T. G. Hegge, Ph.D., as Director of Research. Dr. Hegge was for ten years Associate Professor of Psychology in the Royal University of Norway and has spent the last two years in this country under a fellowship from the Rockefeller Foundation centering his work at the University of Michigan. He spent four years with G. E. Muller in the Psychological laboratory at the University of Gottingen, Germany and other extended periods with Lehman at Copenhagen, Denmark and Jaensch at Marburg, Germany.

Dr. Hegge has been appointed special lecturer in the Department of Psychology at the University of Michigan and is holding seminar courses there for graduate students.

A limited number of openings for resident fellows will be available at the Training School for suitable applicants who are qualified to carry on original work leading to a Doctor's degree. Course credit toward the degree for accepted work done under Dr. Hegge at the Training School will be granted by the University of Mighican to properly registered students.

Any person desirous of being considered for such a fellowship should address Dr. T. G. Hegge, Wayne County Training School, Northville, Michigan.

Dr. Carney Landis, Associate Professor of Psychology and Chairman of the Department of Psychology at Wesleyan University, Middletown, Conn., has resigned his position to accept the post of Research Associate in Psychology at the New York State Psychiatric Institute and Hospital, Columbia Medical Center, New York City, effective September 1, 1930.

BOOK REVIEWS

FLORENCE MATEER. *Just Normal Children.* D. Appleton & Company, New York, 1929. xi + 294 pp.

Just Normal Children deals with the mal-adjustments of children who are of normal or superior intelligence and are not psychopathic. Problems are presented by the case study method and enlarged upon by the Socratic method. In each case Mateer begins with a symptom which has caused adults in charge of the child to become concerned. Then a detailed account of the diagnosis is made, treatment recommended and response obtained is given. This is followed by a series of questions and answers on various aspects of the problem not brought out by the case study. Representative problems are cases of children who did not sleep well, who ate too little or with bad habits, who were lazy, self-assertive, too dependent, restless, liars, trouble-makers, etc. The book is written in common sense fashion. It is free from technicalities and consequently ought to be of much service to those who need it most—mothers and teachers rather than experts. The author does not attempt to present quantitative data or deal with children in the abstract, but instead handles cases as personal and concrete. Anyone who deals with children can profit from this very interesting and able discussion of the abnormalities of normal children.

AGNES E. BENEDICT. *Children at the Crossroads.* The Commonwealth Fund Division of Publications, New York, 1930. 238 pp. $1.50.

This volume records another of the efforts of the Commonwealth Fund to translate the visiting teacher from a dream to a reality. Hitherto much or most of the efforts to adapt schools and communities to the needs of atypical children have taken place in the city. This book relates an attempt to aid the problem child at the country cross roads by means of the visiting teacher. Readers are familiar with the harshness of the crowded city toward the child, but only those who have made first hand observations know the pathetic meagerness of the opportunities presented to children at the little red school house. In this book, as interesting as fiction, and as true as verity, the author gives us a picture of the problem child in the country as he struggles against poverty, lack of play, surfeit of child labor, paucity of mental stimulation, absence of social life and the narrowness of adult minds concerned primarily with their battle against niggardly nature.

Case studies are taken from the records of the visiting teachers in three rural communities which were financed by the Commonwealth Fund for three years. The wealthiest of the three communities has continued the service. The others have not. The account here amply justifies the hiring of a visiting teacher to aid in salvaging these problem children, but we are also shown that such aid in many communities must come from the outside. The factor of economics is an undeniably large one. It is to be hoped that the book will secure many readers, especially among those who believe that "the country is the place to raise a child."

GRACE ARTHUR. *A Point Scale of Performance Tests.* The Commonwealth Fund Division of Publications, New York, 1930. 82 pp. $1.50.

This volume is a manual for clinical use in giving and scoring the tests used in the point scale described. The tests are taken from many sources but are all standardized on the same children. This makes it possible to utilize these performance tests for comparative purposes. Form I was standardized on 1,100 "public school children of a good middle-class 'American' district." Form II was standardized on retests of 535 of these children. Complete directions for giving the tests and translating the point scores obtained into mental ages are given. The author finds the IQ's obtained on the point scale of performance tests agree with the Stanford Binet IQ's as closely as the Stanford Binet IQ's agree with retests on the same scale. However the tests on the point scale do occasionally show significant differences and are valuable for diagnostic purposes whether close agreement with the Binet IQ is found or not. The scale is particularly useful in testing children with a language handicap of any sort.

STUART M. STOKE,
Ohio University.

NEW BOOKS AND PAMPHLETS RECEIVED*

Books and pamphlets for review should be sent to James P. Porter, Ohio University, Athens, Ohio.

Children at the Crossroads. AGNES E. BENEDICT. Commonwealth Fund, Division of Publications, New York City. $1.50. 238 pp.

Experiments and Exercises in Educational Psychology. Third Edition. DANIEL STARCH. Macmillan Company, New York City. $1.80. 254 pp.

Great Experiments in Psychology. HENRY E. GARRETT. The Century Company, New York City. 337 pp.

L'Individualite de L'Enfant. G. ROSSOLIMO. Translated by Vera Kovarsky. Librarie Felix Alcan, Paris, France. 64 pp.

Language Development of the Preschool Child. DOROTHEA A. MCCARTHY. University of Minnesota Press, Minneapolis, Minn. $2.50. 174 pp.

Master of My Fate. HERSCHEL T. MANUEL. The Century Company, New York City.

The Meaning of Sacrifice. R. MONEY-KYRLE. The Hogarth Press, 52 Tavistock Square, London, England. 273 pp.

The New Generation. Edited by V. F. Calverton and Samuel D. Schmalhausen. The Macaulay Company, New York City. $5.00. 717 pp.

The Pattern of Life. ALFRED ADLER. Cosmopolitan Book Corporation, New York City. $3.00. 273 pp.

A Point Scale of Performance Tests. GRACE ARTHUR. Commonwealth Fund, Division of Publications, New York City. $1.50. 82 pp.

Problem Tendencies in Children. WILLARD C. OLSON. University of Minnesota Press, Minneapolis, Minn. $2.00. 92 pp.

Psychology for Students of Education. Revised edition. ARTHUR I. GATES. Macmillan Company, New York City. $2.25. 612 pp.

Psychologies of 1930. ALFRED ADLER, MADISON BENTLEY and others. Clark University Press, Worcester, Mass. $6.00. 497 pp.

Some Social Aspects of Mental Hygiene. FRANKWOOD E. WILLIAMS. American Academy of Political and Social Sciences, Philadelphia, Pa. 214 pp.

Über das Psychogalvanische Reflexphanomen. EBBE LINDE. Verlag von Johann Ambrosius Barth in Leipzig. 90 pp.

Wirkungsformen der Uebung. DR. BENNO KERN. Helios-Verlag G. M. b. h. Munster-Westf, Germany. $5.00. 504 pp.

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* Mention here does not preclude further comment.

Directory of American Psychological Periodicals (*Continued*)

Journal of Personnel Research—Baltimore: Williams & Wilkins Co. Subscription $5.00. 500 pages approximately. Edited by Walter V. Bingham, and Clarence S. Yoakem. Bi-Monthly.

Genetic Psychology Monographs—Worcester, Mass.: Clark University Press. Subscription $7.00 per volume. Two volumes per year, 600 pages each. Edited by Carl Murchison and an international co-operating board. Monthly. Each number one complete research. Child behavior, differential and genetic psychology. Founded 1925.

Psychological Abstracts—Princeton, N. J. Subscription $6.00. 600 pages ann. Edited by W. S. Hunter. Monthly. Abstracts of psychological literature. Founded 1927.

Mental Measurement Monographs—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1925. Edited by Knight Dunlap and Buford Johnson. Published without fixed dates, each number a single research.

Studies in Psychology and Psychiatry—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1926. Edited by Edward A. Pace. Published without fixed dates, each number a single research.

Journal of General Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 600–700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Experimental, theoretical, clinical, and historical psychology. Founded 1927.

Journal of Social Psychology—Worcester, Mass.: Clark University Press. Subscription $7.00. 500–600 pages annually. Edited by John Dewey, Carl Murchison and an international cooperating board. Founded 1929. Quarterly. Political, racial, and differential psychology.

Directory of American Psychological Periodicals

American Journal of Psychology—Ithaca, N. Y.: Morrill Hall. Subscription $6.50. 600 pages annually. Edited by M. F. Washburn, K. M. Dallenbach, M. Bentley, E. G. Boring. Quarterly. General and experimental psychology. Founded 1887.

The Pedagogical Seminary and Journal of Genetic Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Child behavior, differential and genetic psychology. Founded 1891.

Psychological Review—Princeton, N. J.: Psychological Review Company. Subscription $5.50. 480 pages annually. Bi-monthly. General. Founded 1894. Edited by Howard C. Warren.

Psychological Bulletin—Princeton, N. J.: Psychological Review Company. Subscription $6.00. 720 pages annually. Psychological literature. Monthly. Founded 1904. Edited by Samuel W. Fernberger.

Psychological Monographs—Princeton, N. J.: Psychological Review Company. Subscription $6.00 per vol. 500 pp. Founded 1895. Ed. by Raymond Dodge. Published without fixed dates, each issue one or more researches.

Psychological Index—Princeton, N. J.: Psychological Review Company. Subscription $4.00. 300–400 pp. Founded 1895. Edited by W. S. Hunter. An annual bibliography of psychological literature.

Journal of Philosophy—New York; 515 W. 116th St. Subscription $4. 728 pages per volume. Founded 1904. Bi-weekly. Edited by F. J. E. Woodbridge and Wendell T. Bush.

Archives of Psychology—Sub-Station 84, N. Y.: Archives of Psychology. Subscription $6. 500 pp. ann. Founded 1906. Ed. by R. S. Woodworth. Published without fixed dates, each number a single experimental study.

Journal of Abnormal and Social Psychology—Eno Hall, Princeton, N. J. Subscription $5. Foreign, $5.25. Acting Editor, Henry T. Moore. Quarterly. 432 pages annually. Founded 1906. Abnormal and Social.

Psychological Clinic—Philadelphia: Psychological Clinic Press. Subscription $2.50. 288 pages. Ed. by Lightner Witmer. Founded 1907. Without fixed dates (9 Numbers). Orthogenics, psychology, hygiene.

Training School Bulletin—Vineland, N. J.: The Training School. Subscription $1. 160 pp. ann. Ed. by E. R. Johnstone. Founded 1904. Monthly (10 numbers). Psychology and training of defectives.

Comparative Psychology Monographs—Baltimore: Johns Hopkins University Press. Subscription $5. 500 pages per volume. Edited by W. S. Hunter. Published without fixed dates, each number a single research.

Psychoanalytic Review—Washington, D. C.: 3617 10th St., N. W. Subscription $6. 500 pages annually. Psychoanalysis. Quarterly. Founded 1913. Ed. by W. A. White and S. E. Jelliffe.

Journal of Experimental Psychology—Princeton, N. J. Psychological Review Company. 500 pages annually. Experimental. Subscription $6.00. Founded 1916. Bi-monthly. Ed. by Madison Bentley.

Journal of Applied Psychology—Baltimore: The Williams & Wilkins Co. Subscription $5.00. 400 pages annually. Founded 1917. Bi-monthly. Edited by James P. Porter, Ohio University, Athens, Ohio.

Journal of Comparative Psychology—Baltimore: Williams & Wilkins Co. Subscription $6. 500 pages annually. Founded 1921. Bi-monthly. Edited by Knight Dunlap and Robert M. Yerkes.

(Continued on Third Cover)